REPUBLIC OF GHANA

Ministry of Food and Agriculture (MOFA)

Diagnostic Study of the Cotton Sector in Ghana

Draft Final Report

A1051
Nov. 2006

SOFRECO

In association with

Société Française de Réalisation, d'Etudes et de Conseil
92-98, bd. Victor Hugo - 92115 Clichy Cedex - France
Tel: +33 (0)1 41 27 95 95 – Fax: +33 (0)1 41 27 95 96
E-mail: agro@sofreco.com

G.L.G. Consultants
7, rue Claude Bernard -75005 PARIS
Tel: + 33 (0)1 43 31 33 13 - Fax : +33 (0)1 43 31 33 18

Acknowledgement

The Consultants wish to acknowledge the assistance of those who gave their time and provided information to make this assignment possible, particularly members of the MOFA / Crop services

DIAGNOSTIC STUDY OF THE COTTON SECTOR IN GHANA

Table of content

LIST OF ANNEXES

1 INTRODUCTION

Justification and objectives of the study:

Despite a high potential, cotton production remains low in Ghana. Most of the cotton sector key players are facing serious difficulties and Government of Ghana has requested the support of AFD for developing the sector. To assess such an opportunity, AFD and MOFA have agreed that a diagnostic study should be conducted, in order to have a clear picture of the situation, the opportunities and constraints and to provide some recommendations on the preliminary conditions necessary to revamp the industry. The Consulting firm SOFRECO has been selected for that purpose.

Outputs expected from the study (TOR):

"The study will include a review of the operations of the major cotton companies and key stakeholders, a general overview of the international cotton market, a review of the technical, financial, legal, institutional, economic and social aspects of the production, as well as some perspectives and recommendations for the future of this sector".

Mission work programme:

The study has been undertaken by a team of international and Ghanaian experts[1], who began their assignment on August 7th, 2006.
The summary itinerary of the mission is shown in the table below:

Date	Itinerary
	Meetings in ACCRA
7th August	Meetings at MOFA, AFD, MOTI
8th	Meetings at ADB, NULUX, PDL
9th	Meetings at French Embassy, Chemico (Tema)
10th	**Trip to TAMALE**
11th	Honourable Regional Minister NR, RADU, Cotton Standing Committee
12th	Visit GCCL in Bolgatanga; visit to cotton farmers in two villages
13th	Visit to cotton farmers
14th	Meeting with Cotton Companies; meeting with Regional Director RADU
15th	Visit to Cotton Companies
16th	Meeting with Cotton Farmer's Association; visit to cotton farmers
17th	Visit to cotton farmers
18th	Meeting at Bonzali Rural Bank; Debriefing meeting with Regional Director RADU; meeting at SARI
19th	Meeting with Pr Deetoh, UDS
20th	**Trip TAMALE – WA (UW Region)**
21st	Meeting with Regional Director and staff RADU; meeting at PDL; visit to cotton farmers
22nd	**Trip TAMALE - ACCRA**
23rd	Meetings at NULUX (Reinhart), GCCL, World Bank
24th	Meetings at WIENCO, AFD, OLAM
25th	Meeting at Akosombo Textiles Ldt

[1] The mission has been driven by Mr Solomon Ansah, Schedule Officer for Cotton MOFA / Crop Services; the SOFRECO Team members were: Lucien Rossignol (Team Coordinator), Mr Hervé Guibert (Agronomist – CIRAD), Mrs Alice Owiaba (Sociologist), Mr Ben Adamafio (Financial expert).

2 SITUATION OF THE COTTON WORLD MARKET

2.1 World market of cotton (past evolution and recent trend)

2.1.1 Supply of cotton

The world production of cotton is expected to reach 25 millions tons in 2006/7, and the average growth rate over the past 30 years appears to be 2,2% per annum. Cotton is widely produced in more than one hundred countries (among which 59 produce on more than 5 000 hectares) but the supply tends to be increasingly concentrated by the four main producers (China, USA, India and Pakistan) which are now responsible for roughly 70% of the total supply, against less than 50% 30 years ago, due to the rapid increase of the Chinese, Indian an Pakistanis production. Other countries have also significantly increased their production capacity in the last decade, in particular Australia, Brazil and Turkey, while other have decreased (in particular countries belonging to the former USSR). The West and Central African producers, which had a very marginal rank in the world market forty years ago (around 30 000 tonnes), have also considerably increased their production capacity, and account now for more than 1 million tonnes, thus representing over 4% of the world production.

The evolution of world production over the last decades is shown on the table below (in Tons of lint):

	Average growth 1970-2004	Average 1970-71	*Average growth 1970-1980*	Average 1980-81	*Average growth 1980-1990*	Average 1990-91	*Average growth 1990-2005*	Average 2000-05
USA	*2,2%*	2 219	*0,9%*	2 422	*3,4%*	3 376	*2,4%*	4 261
China	*3,4%*	1 995	*3,1%*	2 707				5 363
India	*4,1%*	909	*3,8%*	1 322	*4,2%*	1 989	*4,5%*	3 077
Pakistan	*4,4%*	543	*2,8%*	714	*8,7%*	1 638	*1,8%*	1 949
ex USSR	*-2,8%*	2 342	*1,3%*	2 661	*-0,3%*	2 593	*-9,1%*	998
W and C Africa	*6,6%*	140	*4,8%*	224	*9,6%*	562	*5,5%*	964
Turkey	*2,7%*	400	*2,3%*	500	*2,7%*	655	*3,3%*	902
Australia	*11,1%*	19	*17,9%*	99	*15,9%*	433	*0,2%*	441
Brazil	*2,6%*	549	*1,3%*	623	*1,4%*	717	*5,1%*	1 183
Geece	*4,2%*	110	*0,4%*	115	*6,4%*	213	*6,0%*	380
World	*2,1%*	11 740	*1,7%*	13 831	*3,2%*	18 970	*1,5%*	21 971
% W and C Africa[2]		*1,19%*		*1,62%*		*2,96%*		*4,39%*

2.1.2 Cotton trade

One third of the world production is exported, which makes cotton one of the main traded agricultural commodities. The main users are China, followed by India and Pakistan, these three countries representing more than 50% of the world consumption. Their consumption is rapidly increasing, with the development of their textile industry, in relation with the end of the Multi-fibre Agreement, which

[2] Bénin, Burkina Faso, Cameroun, Côte d'Ivoire, Mali, Niger, République centrafricaine, Sénégal, Tchad, Togo

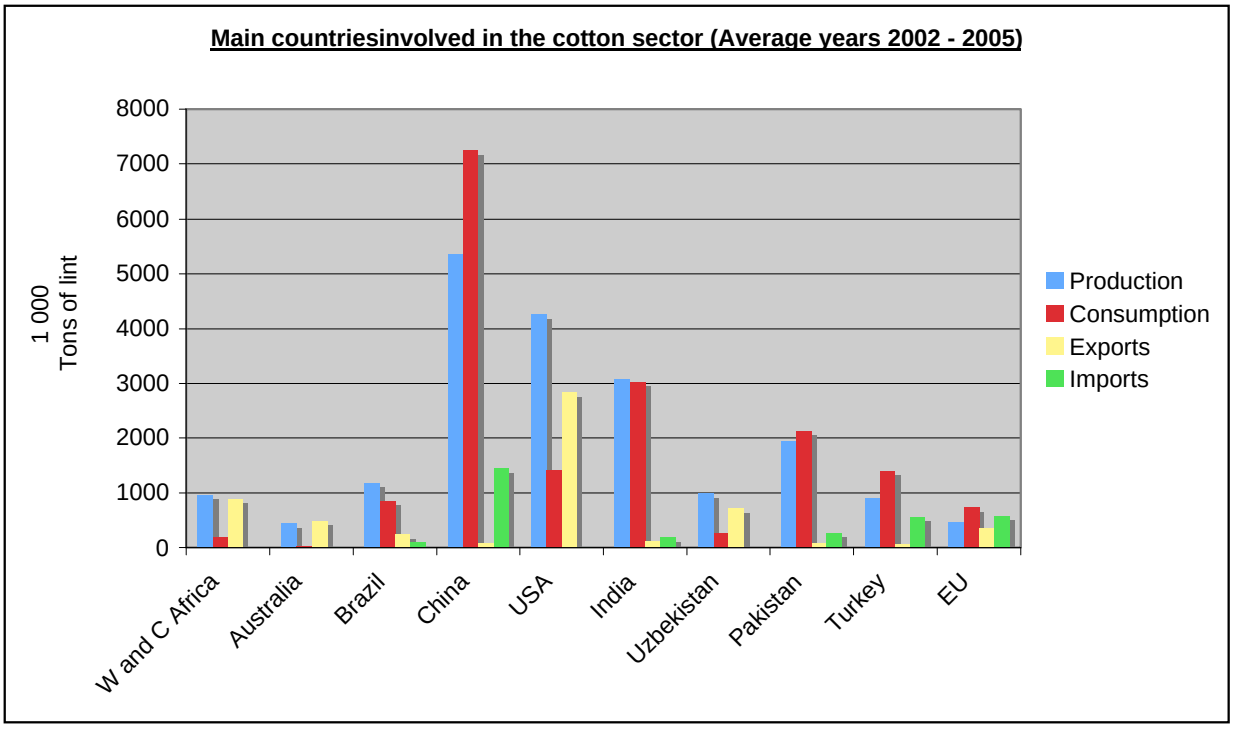
suppressed the import quotas in developed countries. In parallel, consumption in the USA and Europe has been constantly declining, because of the delocalisation of the textile industry.

Despite its growing production, China is now, by far, the main world importer of cotton. The demand for cotton imports by China, which fluctuates from one year to the other, due to local climatic conditions, is therefore a determining factor on the global supply and demand balance, and, thus on prices.

The main exporters or cotton are the USA, followed, as a group, by West and Central African countries, which now account globally for 13% of the world exports, and thus have become a major player in the cotton world trade.

The main producers, consumers, importers and exporters for the period 2002/2005 are summarised and illustrated on the table and figures below (lint):

Main countries (1000 Tons)	Production	%	Consumption	%	Exports	%	Imports	%
W and C Africa	963	4.4%	191	0.9%	889	12.6%		0.0%
Australia	441	2.0%	19	0.1%	487	6.9%	14	0.2%
Brazil	1 183	5.4%	852	3.8%	236	3.3%	95	1.3%
China	5 363	24.4%	7 250	32.7%	69	1.0%	1 448	20.4%
USA	4 261	19.4%	1 424	6.4%	2 834	40.2%	10	0.1%
India	3 077	14.0%	3 033	13.7%	114	1.6%	190	2.7%
Uzbekistan	998	4.5%	274	1.2%	711	10.1%	1	0.0%
Pakistan	1 948	8.9%	2 133	9.6%	74	1.0%	268	3.8%
Turkey	902	4.1%	1 397	6.3%	59	0.8%	565	8.0%
EU	466	2.1%	734	3.3%	350	5.0%	585	8.2%
Total World	**21 970**	**100.0%**	**22 141**	**100.0%**	**7 054**	**100.0%**	**7 106**	**100.0%**



2.1.3 Demand trends

The world demand has, overall, increased at the same rhythm as production over the 3 last decades. It has however been evidenced that the per capita consumption remains stable, while the market share of cotton among all textile fibres has been reduced over the last 30 years from 60% to 40%, because of the rise of synthetic fibres, the characteristics of which have constantly improved. The loss in market share for cotton seems, according to all available studies, to be a long-term trend, irrelevant of the respective prices of cotton and synthetic fibres. The continuous price increase of oil prices, which has a direct effect on the price of synthetic fibres, may however have a positive effect in the future on the demand for cotton, and therefore on the cotton prices.

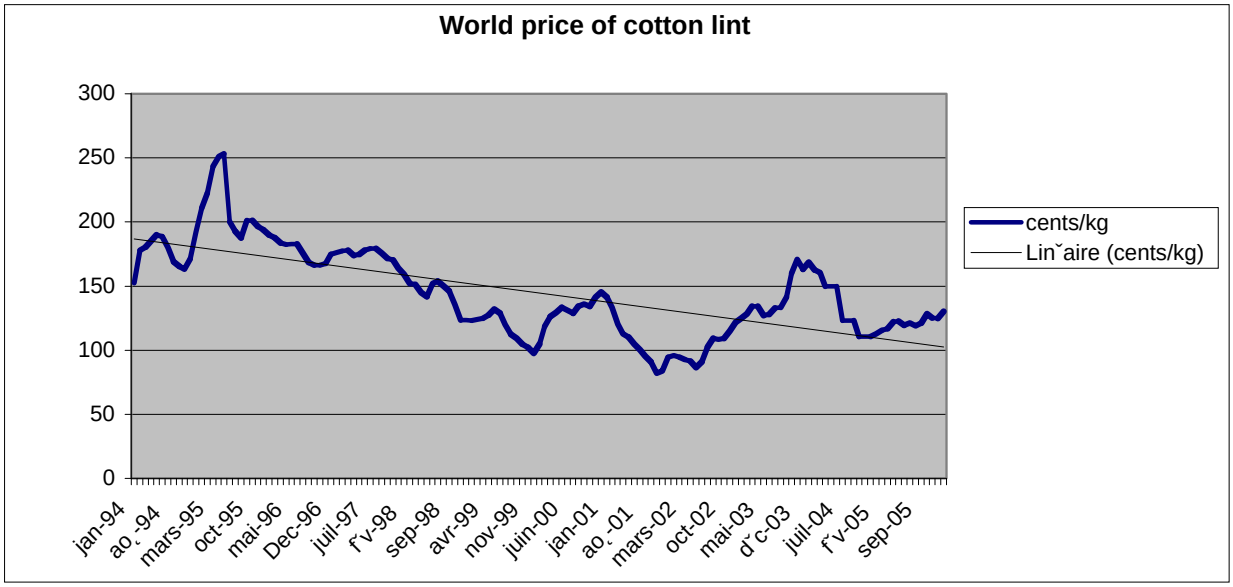
2.1.4 Long and medium term price trend

Cotton world prices seem to be affected by a long-term negative trend, as evidenced by the graph below. The magnitude of this trend depends of course of the period of time taken into consideration. On a 40 years period, the trend would be – 0,24% per annum, which is twice the average trend for agricultural commodities. This negative trend seems to have increased during the last 10 to 15 years up to 1% or more, probably due to a combination of factors:

- the average yield of cotton has continuously increased, especially in the main producing countries (it has increased, as a world average, from 400 kg/ha to 654 between 1980 and 2005), while production costs have decreased, because of higher yields and because of the recent introduction of genetically modified cotton, which represents nowadays around 50% of the world production.

- as already mentioned, there have been substantial production increases in several countries (Brazil, Australia, Turkey)

- finally the market has been distorted by the subsidies on cotton production and exports paid in the USA, and, until recently, in Europe (the total amount of subsidies was estimated in average at 4 billion dollars per year between 1999 and 2004). The real impact of those subsidies on cotton prices is a controversial issue, and its estimate varies, as several studies give very diverging figures. In a recent publication, ICAC, usually considered as one of the most reliable sources, estimated that, without subsidies, cotton prices would have been 10% higher between 2002 and 2004. In addition to this direct impact, it is clear that such subsidies result in a lack of transmission of market signals to producers, and therefore tend to prevent the supply to be adjusted to demand, thus amplifying price fluctuations. Some studies thus argue that a suppression of US subsidies would immediately result in a drop by 15% of US production (which is exported to a large extent, and therefore has a strong influence on world prices).



2.1.5 Price prospects

Cotton market prices are best reflected, as concerns African cotton, through the daily Cotton outlook index A, which gives price quotations provided by the major traders. These index prices are expressed in C+F terms (Far East), from which the FOB price can be derived by subtracting 0,45 cents/lb ($ 0,1/kg) corresponding to freight, insurance and miscellaneous export costs.

After 3 recent market crises (in 1999/200, in 2001/2003 and in 2004/05), cotton prices have remained within au tunnel between 55 cents/lb and 59 c/lb since the beginning of 2006, which shows a light improvement over the past years (the average price between 2001 and 2005 was at 55 cents/lb). The short and medium term price prospects depend mainly on the following variables:

- Chinese import needs, which depend mainly on local climatic conditions

- The evolution of the negotiations on trade liberalisation (Doha round) within the World Trade Organisation: in response to a claim from a number of African producing countries, the European Union decided in 2005 to eliminate the link between production and subsidies on cotton, thus eliminating incentives on production, which had, in the past, a clearly distortive effect; the USA decided to put an end (in 2006) to its export support programme on cotton, but the last WTO conference held in Hong-Kong at the end of 2005, failed to obtain a US commitment to stop their domestic support programme on cotton, considered as the most distortive on markets and prices. Negotiations are still going on. If an agreement is however reached in the coming months, leading to the end of the US domestic support programme, it will result in a sharp fall of US production, which will have most probably an immediate effect on prices. Such a rise in price may however be offset in the medium term by the supply response from some countries (in particular Brazil) which have an important production potential and are able to switch rapidly from one crop to another, depending on market outlooks.

In the longer term, the cotton price prospect will be affected by several factors:

- The capacity of China (main cotton producer, consumer and importer) to sustain the same rhythm of production increase as in the past: many experts believe that

such a rhythm is not sustainable in the long term, because of competition with food crops, in a context where agricultural land is limited.

- Production costs: the world average production cost in FOB terms was estimated by ICAC in 2004 at $1,14/kg (52 cents/lb) which corresponds to a C+F cost of roughly $1,24/kg (or 56,5 cents/lb), but some countries among the most dynamic ones (Brazil, Pakistan, Argentina, Australia…) have costs below $1(45 cents/lb). At current prices, cotton is close to the breakeven price based on the world average, but still profitable in those countries, and growing production trends should therefore not be affected. The situation may however be different if oil prices continue to rise and exceed, for instance, $100 per barrel. At such a level, mechanised cotton producers (for instance in Brazil and Australia) will be heavily penalised in terms of production costs.

- The world demand for cotton, which may increase faster than in the past, due an increase of the market share of cotton, in case of a continuous and sharp increase of oil prices.

Based on those considerations, ICAC forecasts a medium term (2008/2010) price relatively stable around 60 cents/lb. The World Bank is more optimistic, mainly because of a more restrictive perception of the production capacity of China, and considers a price of 63 cents/lb in 2010 and 65 cents in 2015. In conclusion, considering the fact that ICAC forecasts are usually more accurate than the World bank's ones concerning cotton and considering production costs, it seems prudent to anticipate an FOB medium term price of 60 cents/lb (in constant value). In the longer term (after 2015), the decreasing trend may be expected to continue, unless further increase of the oil prices.

2.2 Cotton production in Central and West Africa

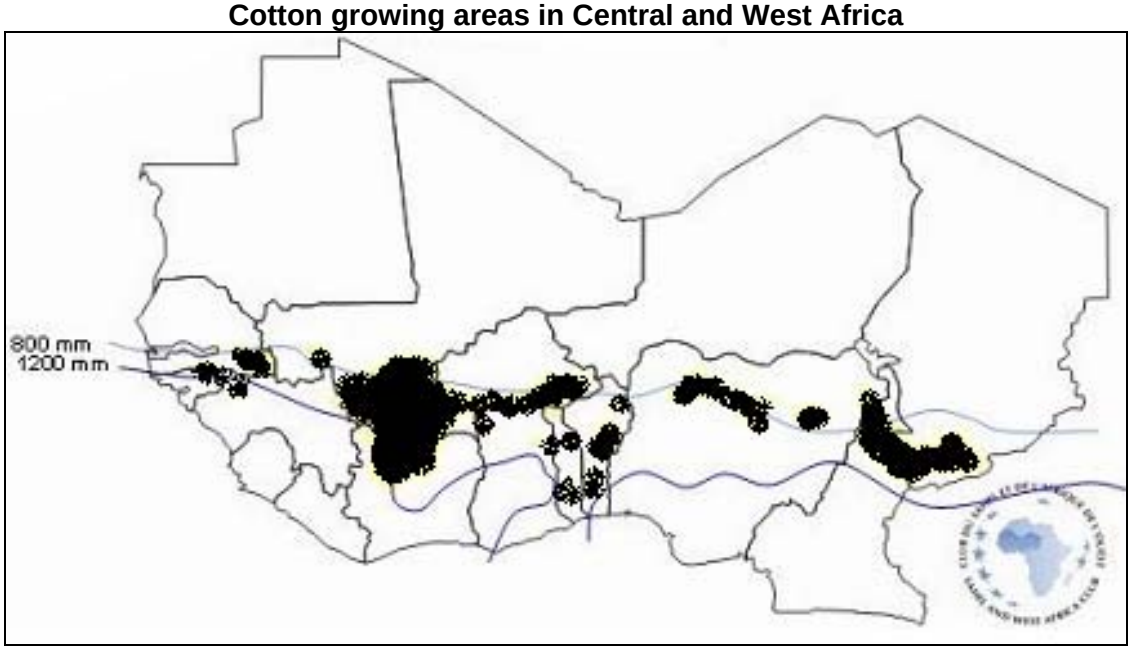
Cotton is grown in West and Central Africa between isohyets 800 and 1200, mainly in three geographical areas located, for the first one, in Mali, Burkina Faso, Ivory Coast and Ghana, for the second one in Togo and Benin, and for the third one, in Chad and Cameroon. As shown on the table below, the total production has doubled over the past decade, showing a growth rate particularly high in Burkina Faso, Benin, and Cameroon.

Seed cotton (1000t)	Benin	Burkina Faso	RCI	Mali	Chad	Senegal	Togo	Cameroon	RCA	Ghana	**Total** [3]
1993/94	161	163	238	319	121	47,5	105	128	22	22	**1 326**
2004/05	427	631	300	587	195	50	172	278	1,5	25	**2 666**

Source : Agence française de Développement

[3] excluding Nigeria, the production of which is estimated by FAO at 135 000 Tons in 1994 and 250 000 Tons in 2004

Cotton growing areas in Central and West Africa



Source : Club du Sahel.

Cotton cultivation in West and Central Africa is entirely rainfed, and concentrated in a climatic zone where climatic risks are important. Cropping practices are essentially manual (except in Ghana), which makes cotton a very labour intensive crop. Cotton requires, in these areas, a relatively important work for weeding, crop protection and fertilization. It is usually cultivated in rotation with food crops, in particular maize.

2.3 Organization of the cotton supply chain and price setting mechanisms in West and Central Africa

2.3.1 General overview

All cotton companies in the CFA zone were initially built, in the 1950s and 1960s, on the same model: a parastatal company operating on a nationwide basis (but restricted to areas suitable for cotton cultivation) and assisted by a French parastatal specialized in the cotton chain, CFDT (now renamed as DAGRIS). The national parastatal had a monopoly on seed cotton and lint marketing. Because there was virtually no services available, these parastatals were fully integrated, with all downstream and support activities under its control: extension, supply of inputs associated with a credit based on seed cotton production as collateral, purchase and transport of seed cotton, ginning, marketing of lint and seeds, and, in some cases, oil extraction. The State was indeed strongly involved, as the owner of the company (or main share holder) and as the main source of financing for the development of the sector.

This organization scheme allowed a rapid development of the cotton sector in most countries, as it could ensure and secure the provision of inputs and equipment on a credit basis, together with technical advises to farmers. It showed however progressively its limits: risks of political interferences, lack of incentives of cotton companies to optimize their cost and maximize the return to farmers, sometimes lack of long term vision and difficulty for the State to play adequately its role of leading share holder of the company,….. In such a context, cotton supply chains in CFA zone have been, during the last decade, undergoing important organizational changes, concerning in particular:

- Targeting the activities of the cotton companies on the key functions of the supply chain (extension, purchase of seed cotton, ginning, and marketing), while other

support functions are progressively transferred to private companies under contract, to farmers associations or to Government public services,

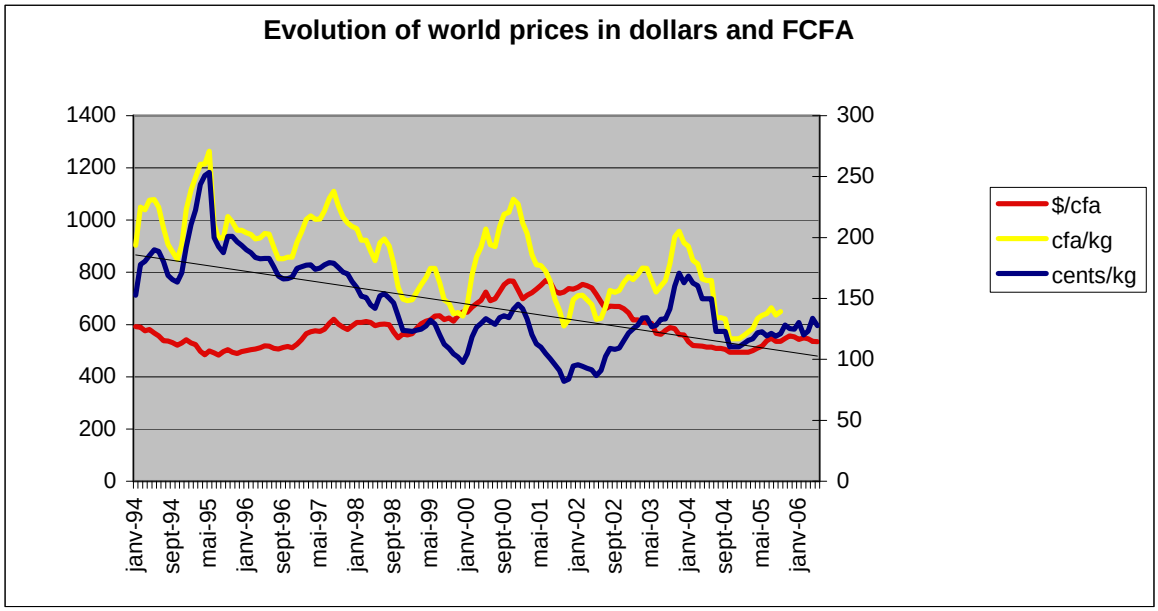
- Withdrawal of the State from the cotton companies, through the coming of new private partners or producers associations in the capital of the companies,

- Withdrawal of the State from the overall management of the supply chain, through the creation of an industry-wide board *(inter-professional body)*, including the cotton company and farmers associations, and, in some instances, the Government as an observer.

These changes are still under way in most concerned countries, and the rhythm of reform differs from one country to the other.

Producer price setting and stabilization mechanisms have always been a main concern for Central and West Africa cotton producing countries, as in a single buyer system, prices have to set at a fixed level for each campaign, on a pan-territorial basis. Before liberalization of the cotton sectors, prices were usually set administratively at a low level, without reference to world prices. Profits of the cotton companies were partly turned to a stabilization fund, supposed to support producer prices when world prices are low, but in reality unable to do so, as the funds have often been used for other purposes. In view of this failure, most cotton sectors under liberalization adopted, during the pas decade, new mechanisms, more transparent and under the control of stake holders. As discussed in the following paragraphs, these mechanisms were able to avoid drastic price fluctuation for a number of years, but none of them has been able to resist the ongoing price crisis.

It should be noted that francophone African cotton producers have been much more affected than others by the recent market crisis, as their local currency (CFA Franc), bound to the Euro, has been in recent years, overvalued as compared to the dollar, resulting in a aggravation of the price decline, when expressed in local currency, as shown on the graph below.



2.3.2 Countries outlook

In **Cameroon**, the majority of the capital of SODECOTON (the local parastatal company) is still with the State, but new shareholders (including DAGRIS) entered, and represent now 40% of the shares. A full privatization is considered, but no decision has been taken so far. SODECOTON is still a fully integrated company, which operates a dense network of extension agents, has its own transport fleet for seed cotton, owns all the ginneries, exports, and operates its own oil extraction plant. In parallel, local associations of cotton farmers were created, with the assistance of SODECOTON, and grouped in an APEX association, which now participates in the overall management of the supply chain, in full co-operation with the cotton company: they participates in the decision on prices paid to farmers; they have their own self-insurance fund, fed by price premiums on cotton purchase paid by the cotton company; they are taking over progressively extension functions from SODECOTON; they manage village level cotton markets, where seed cotton is assembled, thus helping the collection by the cotton company. It is worth noting that, though it still has the majority of shares in the cotton company, the Government does not interfere in its management. Altogether, the reforms undertaken by SODECOTON can be considered as a success.

The price setting mechanism is not formalized: prices are decided jointly by SODECOTON and the producers association before the starting of the campaign, and a premium is eventually paid to the association if the campaign is profitable. This premium feeds a fund belonging to the producers, or may be used, if so decided by the association, to complement the producers price the following campaign. In addition, SODECOTON has its own reserve fund, which may be used when world prices are low to complement the producers price or replenished when world prices are high and the company profitable. This informal scheme worked successfully for a decade and was able to stabilize producers prices, but all the reserves accumulated by the two funds were used in the two last campaigns, during which SODECOTON incurred heavy losses, as the producer price remained well above the breakeven point.

In **Senegal**, the parastatal (SODEFITEX) has been privatized in 2004, as the majority of shares have been sold from the Government to the French cotton operator DAGRIS. A part of the capital is further planned to be transferred to the Producers association, but the transfer is still under way.

The cotton company is still fully integrated, and operates a subsidiary in charge of rural development in the cotton growing area. DAGRIS has shown up to now no intention to transfer support functions to private contractors. A shareholders agreement, signed between the Government and DAGRIS when the privatization took place, defines the management objectives of the company and mutual obligations. A cotton sector management committee was also created, grouping, as members, the cotton company, the Government and the Producers association. The main function of this committee is to set each year the price of seed cotton (pan-territorial price for the duration of the whole campaign) and to manage a support fund for cotton prices, which has been existing since 1994.

This fund is supposed to be fed by the cotton company when it makes profits and to be used, otherwise, to compensate the losses of the company. This system allowed the cotton company to maintain relatively high prices until 2005, but became bankrupt in 2005/6, leading the Government to compensate the losses incurred to the cotton company. A new mechanism is now considered by the Cotton management committee *(comité interprofessionnel)* , which should have more binding operating rules and might be shaped upon the new system recently designed in Burkina Faso.

The Government is planning to withdraw from the Cotton management committee, but is still supporting actively the sector, considered as essential for the development of the southern part of the country, as it does for other strategic agricultural sectors, through subsidies to the support funds (when necessary) and to subsidies on inputs.

In **Mali**, the parastatal cotton company, CMDT, has still a full monopoly on cotton marketing, but has withdrawn progressively from a number of support functions: it has abandoned its role of rural development institution in the cotton zone; it is not responsible anymore for road maintenance in the cotton area; it has sold out its subsidiary for oil extraction; it has withdrawn from input supply, which is now taken over by farmers cooperatives (still using seed cotton as a collateral).

As there were evidences of a poor management of the cotton company (which accumulated heavy losses in the past years), the donors have insisted on the need to privatize CMDT, which met a strong resistance from Government and was postponed several times. It has finally been decided that it would take place in 2008, including:

- A dismantlement of CMDT

- Creation of 4 private regional cotton companies, which would have a monopoly in their respective zones

- Creation of an APEX cooperative of cotton producers, grouping the local cooperatives

- Creation of an APEX association (Interprofession), grouping the new national cooperative of producers and the industry; this new association will be in charge of the overall management of the supply chain

- Creation of a quality control company, owned by the Apex association.

The price setting mechanism changed several times. Following the collapse of former mechanisms, a new one was designed in 2002, based on the following principles:

- A minimum price to producers is calculated on the basis of the estimated production cost; this price is paid to the producer, irrelevant of the fiber price, during the campaign

- A theoretical profit/loss of the cotton company is calculated at the end of the campaign on the basis of standard costs; if the result is a profit, it is shared between the producers, the cotton company and the price support fund; if it is a loss, it is borne by the fund.

This mechanism proved to be inadequate, as it resulted in heavy losses exceeding the contributing capacity of fund. An agreement was reached in 2005 for a new system, for the 3 coming campaigns, according to which: the producer price would be set at 160 FCFA/kg, but could be even lowered if world prices make it necessary; the estimated profit of the campaign (on the basis on standard prices and costs) would be shared between producers (60%) and the cotton company (40%); the share belonging to the producers could either paid to them or capitalized in a price support fund (belonging to the producers association), the creation of which is however not a condition for the operation of the mechanism. A study is currently under way for the feasibility of the fund.

In **Burkina Faso,** the Government sold shares of the parastatal, SOFITEX, to Dagris, local banks and the association of producers in 2001, thus losing the majority in the capital. The company has a monopoly on cotton marketing, and is fully integrated,

with its own (limited) extension network and its input supply scheme. More recently, SOFITEX has withdrawn from 2 zones, where private companies (FASO COTON and SOCOMA, controlled by DAGRIS and by a major cotton trader Reinhart) are now operating, also with local monopoly and full integration.

In parallel, the local cotton growers associations have created an APEX, the National Union of cotton producers of Burkina. In 2006, an APEX body grouping producers, the cotton companies (*inter-professional body*) and the Government as an "observer", was created, and given full responsibility for the management of the supply chain, in particular for setting up operating rules and prices (pan-territorial fixed price throughout the campaign). Following this move, it can be considered that the Government has virtually withdrawn from the sector.

A price setting and support mechanism was established in 1999, through an agreement between the industry and producers. It was based on:

- A minimum producer price of 175 FCFA/kg;

- The setting up of a floor FOB price (650 FCFA/kg), above which SOFITEX is supposed to make profits, and under which SOFITEX receives a compensation from the support fund;

- A sharing of the profit of the campaign between the support fund, SOFITEX and producers (their share is distributed, and a price premium, at the following campaign)

- A support fund used to cover the estimated losses of SOFITEX and finance some support functions (in particular road maintenance) and replenished when world prices are above the floor price.

This system worked until 2005, but was unable to cover the losses of the cotton companies for the campaign 2004/5, generating a severe cash crisis, which is now threatening the whole supply chain. A new mechanism was therefore urgently set up in 2006, differing mainly from the previous one on the fact that producers prices would be set on the basis of the world market (95% of the average of FOB prices for the 3 past campaigns and forecast for the 3 coming campaigns), with no more minimum price; this change resulted in a decrease of the producer price from 175 to 165 FCFA. It has however not solved the cash problem of the cotton companies, which is likely to worsen in 2006/7, as the producers prices is probably still above the break even point.

In **Benin**, the privatization process started earlier than in other countries, and has gone much further. The monopoly of the parastatal, SONAPRA, was suppressed in 2000, following advises from the World Bank, and new private ginneries were authorized. SONAPRA is furthermore scheduled to be privatized shortly. An APEX association (AIC), created in 1999, groups all the stake holders in the supply chain, including producers associations and ginners, and a producers' cooperative is in charge of coordinating private input suppliers. while the overall coordination of the supply chain is given to AIC.

This complex organization, the first one to set up in francophone countries to replace the monopoly of the parastatal company, has not given the expected results: the new system does not really foster competition among actors, especially ginners, as the sale of seed cotton to the ginners is decided, without competition, by SONAPRA, on the basis of a quota system; the newcomers in the ginnery industry do not play by the rules, and, in some instances, lack professionalism; the coordination body remains very weak, and, finally, despite the liberalization, the Government is interfering

constantly in the management of the supply chain, in particular, through SONAPRA. These shortcomings have resulted in heavy posses for the supply chain, delayed payments to farmers, and, finally, in a sharp decrease in production.

In **Togo**, the marketing of lint was liberalized in the last decade, allowing a number of private ginneries (SICOT, SOPIC and SOCOSA), to be created, while the parastatal SOTOCO has kept the monopoly on the collection of seed cotton. Despite a remarkable growth in the 1990's, as production increased from 63 500 tons in 1987 to 187 000 in 1998, the sector has been facing during the last 5 years a major crisis, resulting in a recent decline in production, yields and number of farmers. This situation is mainly due to the insolvency of SOTOCO, who has accumulated losses, because of poor management, unrealistic producers prices in a context of declining world prices, and lack of cost efficiency. As a result, SOTOCO has accumulated debts (nearly 50 billions FCFA in 2006), in particular to producers, who are not paid anymore upon delivery of the seed cotton, and are therefore discouraged and compelled to extensification. The insolvency of SOTOCO may result in a general liquidity problem for banks and for the whole economy. A recovery programme is currently being studied.

2.3.3 The cotton price fixation system in Ghana

In Ghana, the seed cotton price fixation system is based on discussions between the producers and the cotton companies, held before the sowing period (month of April). During the discussions, two approaches are used:

- Producers take into consideration (i) the costs of production, including the cost of casual and family labor, (ii) the expected average yield, and (iii) add a profit per hectare, resulting in a minimum price in Cedis per kg of seed cotton,

- Cotton companies consider the world price of cotton lint (and secondarily the price of cotton seed), deduct the various costs between the seed cotton cost and CIF lint and seed prices (transport, ginning, administrative costs, profit), and calculate a maximum price for seed cotton.

Those two methods often lead to incompatible figures, producers wanting prices that cotton companies consider as unacceptable for them, taking into consideration the situation of the world market. The main topic of disagreement is usually the cost of labor at farm level, since it is difficult to assess the proportion of hired and family labor. The situation has become particularly difficult in the year 2006, with low world prices for cotton lint and cotton companies facing years of losses. Producers, proposing a price for seed cotton of Cedis 3 000 / kg (same as in 2004 and 2005), could not agree with cotton companies who proposed a price of Cedis 2 850 / kg. Producers threatened to stop producing cotton and GCCL finally accepted the price of 3 000 / kg, the other companies having therefore no choice but to accept it.

This kind of situation is neither satisfactory and nor sustainable; an objective and neutral price fixation system should be agreed upon by the producers and the cotton companies, enabling both stake holders to live from the cotton production.

From the experience obtained in francophone countries, it appears that the following principles should apply in order to set up a proper seed cotton price fixation system:

- A system based on a negotiation between producers and cotton companies using both the costs of production and the world market leads systemically to over priced seed cotton when the world prices are low, leading to losses for the cotton companies (present situation in Ghana, and also in most francophone countries),

- There cannot be any objective estimation of the costs of production, since they are based on theoretical hypothesis, especially in terms of yield per hectare and cost of the family labor,

- Both stake holders should agree on an objective formula for the calculation of the seed cotton price, based on the lint world market and easily computed costs between the lint price and the ginneries (transport costs, FOB to CIF costs, norms for ginning and administrative costs),

- World prices should use forward index, and there could be a two stage price fixation system: (i) an indicative, prudent bottom price could be set up before the sowing period, enabling the farmers to decide whether they will (or not) grow cotton), and (ii) a final price determined after the sales, based on real prices (average Cotlook spot index) of lint. In case of an extra price obtained from higher than expected lint price, the benefit could be shared between producers and cotton companies, using an agreed key of allocation.

2.3.4 Lessons learnt on price setting systems and ways to protect producers against drastic price fluctuations

Recent reviews of the existing systems as well as studies (in particular by Agence Française de Développement) on new possible mechanisms have come to the conclusion that, in order to ensure a producer price fixed throughout the campaign and disclosed before the campaign, a price setting mechanism, associated with a mechanism to "smooth" price fluctuations, was necessary to the development and even to the survival of cotton sectors. Such a mechanism should correspond to a number of criteria:

- The mechanism should be part of an agreement between producers and industry, and should be under the control and management of an *inter-professional body*

- The setting of the producer price, which is to be done before the start of the campaign, should however not be left to a negotiation between stake holders, which has proved to systematically lead to mis-estimation of the world price trends; it should be made on the basis of a mathematical and transparent formula, using verifiable parameters and leaving no space to interpretation. This formula should be based on the world price trend, but should be shaped so as to smooth too drastic variations of the world market; the best way to do so is to base it on the exponentially weighted average between the average Cotton Outlook Index for the 3 previous campaign and the forward index for the coming campaign at the time prices have to be set (in April).

- The setting of the producer price should be prudent (i. e. the price should be slightly lower than the average trend mentioned above), so as to limit the risk of a price fall during the campaign; the best way to do so is to associate it with the payment of a premium to producers in case the average world price turns up to be higher than the trend. The premium paid to producers corresponds to the share of the estimated profit of the supply chain allocated to them.

- The calculation of the estimated profit and of the share of this profit allocated to producers cannot not be based on actual costs and selling prices of cotton companies, which would not be incentive to maximize cost efficiency and is virtually impossible to verify; it should rather be based either on standard cost (calculated by independent consultants) and Cotton Outlook Index, or on a fixed percentage of the average world price (as in the new schemes in Burkina and Mali, where producers receive 60% of world prices, and cotton companies 40%).

- A price support or smoothing fund is necessary to cover or reduce the risks of loss for the cotton company, if actual prices fall below the reference on the basis of which the producer price was calculated; this fund should be operated by a private bank, on the basis of well defined rules, under the control of the *inter-professional body;* there should be clear mechanisms to replenish automatically the fund when the cotton company is estimated to make a profit (i. e., the profit sharing scheme should allocate a part of the estimated profit to the fund, before sharing the remainder between producers and cotton companies). The ceiling of the fund (above which no replenishment is necessary) should ideally be around $0,2/kg of lint exported, in order to cope with possible world price fluctuations.

Market tools (futures, put and call options on futures…) can also contribute to reduce the risks born by the cotton companies and mitigate the impact of price fluctuations on stake holders. Their use, however, requires a specific training of the cotton company and an access to future markets, which is not ensured in the present regulatory context.

3 SITUATION OF THE COTTON SECTOR IN GHANA

3.1 Historical background

The promotion of cotton production was initiated during the sixties, and has shown a rather chaotic evolution during the next decades, with various changes of policies; the table below summarizes the main stages of evolution of the cotton industry in Ghana:

Date	Decision/Reform
June 1968	Establishment of the Cotton Development Board
1985	Transformation of the CDB into the Ghana Cotton Company Ltd, Govt. of Ghana holding 30% of shares. Other shareholders were textile companies, input suppliers and the Agricultural Development Bank Establishment of Nulux and PDL Cotton Companies Inputs supplied “free” to farmers. Compensated by lower buying prices
1986	Entry of several other Companies into the industry (Juni Agro, Agro star, Upper West Cotton Promotion Ltd., Intercontinental Farms, Bafcot)
1995	Sales of 30% shares in GCCL by Government Start of supply of inputs as “in-kind” loans to cotton farmers by GCCL Diversion of inputs becoming a disturbing problem
1996/97	Twelve Cotton Companies involved in cotton production Role of Government becomes insignificant (indirect influence only through the ADB)
1997/98	Set-up of the Cotton growers’ Association
1999/2000	Cotton Companies become alarmed by the level of poaching
2000 to 2002	Tentative Zoning in cotton areas
2000	ADB stops financing private Cotton Companies, because of their heavy debts
2003/04	Tentative privatisation, aborted, of GCCL
2004/05	ADB takes control of GCCL, through a debt-equity swap
2004	Small companies are not active anymore in the cotton sector
April 2006	Setup of a “Standing Committee”

Recognising the potential of Ghana to cultivate cotton, the government of Ghana in 1968 set up the Cotton Development Board (CDB) with the mandate to stimulate the production of cotton, ensure adequate supply of raw materials to local textile industries and undertake research on improved varieties.

To achieve their mandate, CDB provided registered cotton growers with cotton seeds, fertilizers, insecticides, tractor and extension services and in turn bought the seed cotton produced, ginned and sold the lint cotton. Initially, this aroused the interest of farmers and production increased gradually reaching a peak in 1976. After 1977 production fell continuously due to declining producer prices relative to food crops.

CDB continued to experience problems and upon the recommendation of the World Bank, it was privatized and became the Ghana Cotton Company in 1985, with 30% shares taken by government. The cotton sector was also liberalized and this saw the entry of several other cotton companies. With financial support from the Agricultural Development Bank (ADB), cotton companies provided cotton seed free to farmers and fertilizers, insecticides and tractor services on credit which they recovered when farmers sold their seed cotton to them.
This unlimited liberalization ushered in a period of extensive malpractices by all key actors. While cotton companies poached farmers of other cotton companies and offered bad quality services, farmers received inputs from one company but sold their seed cotton to another and thereby avoided payment for input supplied. Some farmers also registered with two or more cotton companies and received inputs from different companies for the same cotton farm and diverted some of the inputs for their food crops or sold inputs in the open market. Cotton production assistants (CPAs) employed by the cotton companies also cheated by presenting 'ghost' names and receiving inputs and selling these.

These occurrences led to high indebtedness of the cotton companies to ADB which from year 2000 ceased to fund cotton companies. Consequently, several of the smaller cotton companies are unable to provide input for their farmers and have suspended operations.

To address crises in the sector and to bring sanity to the operations of the companies and the farmers, the Ministry of Food and Agriculture (MOFA) introduced in 2000-2001 the principle of zoning by which the cotton growing areas were zoned for particular companies. This meant that farmers within a zone were limited to dealing only with the company assigned to operate in that zone.

Some cotton companies were unhappy with zones assigned to them and others made incursions into zones of other companies. Some farmers also refused to work with companies assigned to them and refused to cultivate cotton. The source of the complaints was mainly because both farmers and cotton companies felt they had not been adequately involved in the process.

After about five years, the zoning has come to stay and farmers and companies alike have come to accept it as good and confirm that the zoning has led to reductions in the malpractices that existed. They are however calling for a review to make it more aligned to the situation on the ground.

In 1999, when zoning was being introduced there were about 16 companies operating within the cotton industry but due to factors such as low returns on investments, low cotton lint prices on the world market, high interest rates on commercial loans, most of them have collapsed leaving only four companies. The table below presents an overview of the zones in existence as at 2005:

Currently operating Cotton Companies and zones

Company	Zone / Districts	Hectares under cultivation in 2006
Nulux Plantation Limited	Saboba/Chereponi District Gidanturu (East Gonja)	1,930
Intercontinental Farms Limited	Gambaga (East Mamprusi District)	1,000
Plantation Development Limited	Wa Bole Nandawli Jirapa/lambushi	1,545
Ghana Cotton Company Limited	Yendi District Savelugu/Nanton District West Mamprusi District Nakpanduri (East Mamprusi District) Sissila East and West Bawku- Zebilla District, Bunkpurugu District Bolgatanga, Builsa- Sandema District	15,068

Source: MOFA, Northern Region and Cotton Companies

3.2 Situation of cotton growing area IN Northern Ghana

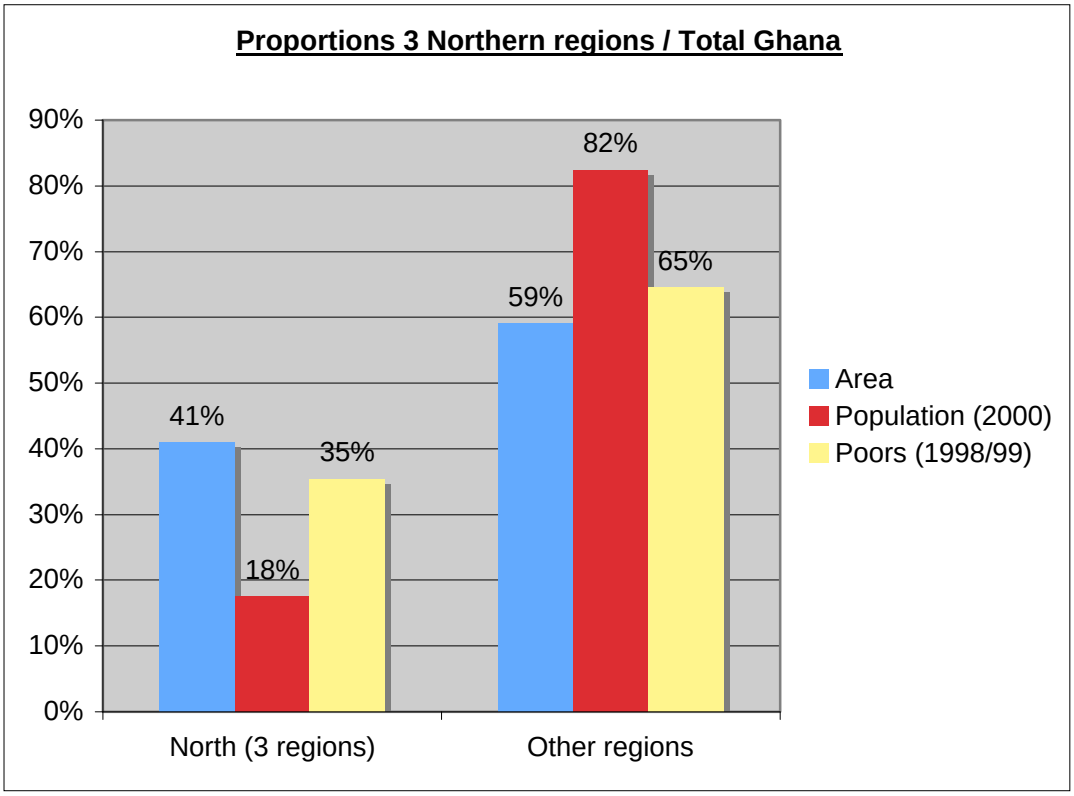
3.2.1 Population

The cultivation of cotton has the potential of becoming a major cash crop in northern Ghana and as some put it become “the cocoa of the north” given the needed boost. The lack of a viable cash crop in northern Ghana has been associated with the pronounced poverty in the three northern regions, as farmers in these regions depend mainly on their food crops for both food supplies for their families and cash incomes.

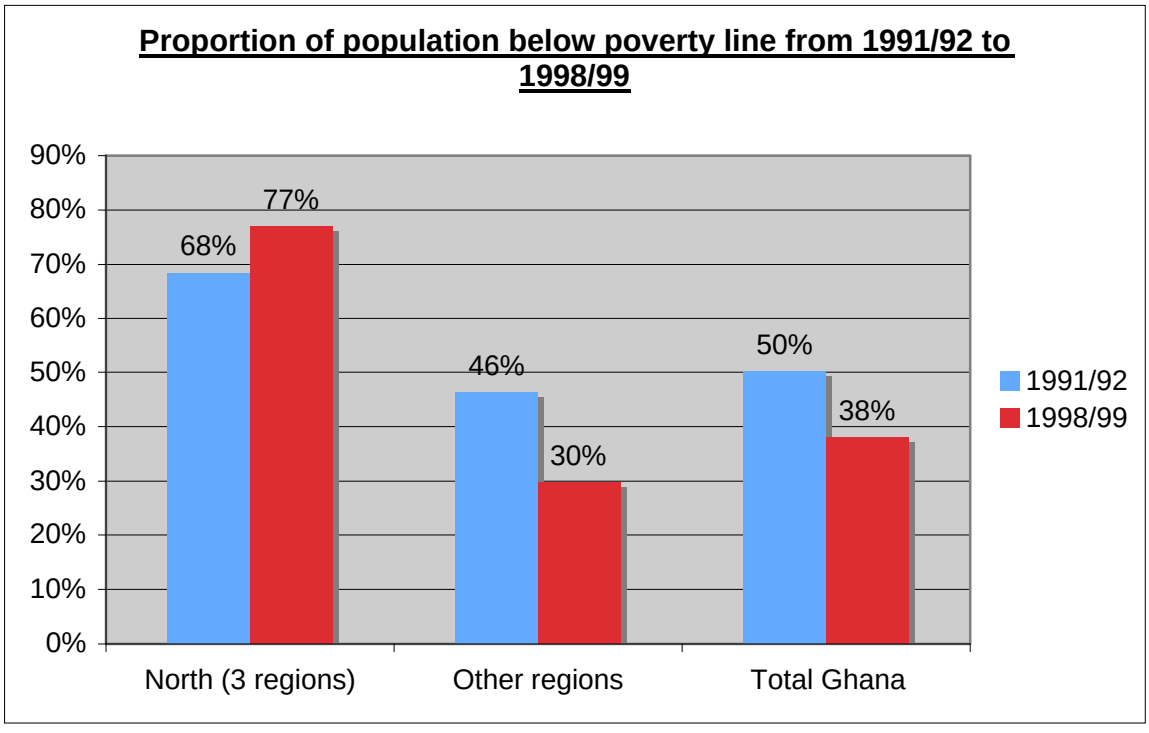
Ghana experienced growing and deepening poverty in the 1980s and 90s, an evidence of intensification of vulnerability and exclusion among some groups and in some areas, especially in the north of the country and the Central Region. Moreover, population growth during the period far outstripped the rate of decrease in poverty levels.

According to the Ghana Poverty Strategy, five out of ten regions in Ghana had more than 40% of their population living in poverty in 1999. The worst affected being the three northern savannah regions (the Upper East, Upper West and Northern Regions). Nine out of ten people in the Upper East; eight out of ten in Upper West, seven out of ten in Northern Region and five out of ten in Central and Eastern Regions were classified as poor in 1999 as shown in the figure below.

The Annex 1 and the graph below shows how the three northern regions of Ghana are the poorest ones:



Contrary to other regions, the situation has not improved during the nineties, the proportion of people living under the poverty line having increased, as shown in the graph below:



Food crop farmers in the country have the highest incidence of poverty. They constitute fifty-nine percent (59%) of the poor in Ghana. This has been due to several factors including lack of access to markets, high cost of inputs and low levels of economic infrastructure.

Poverty reduction in the north where over 70% of the active population are engaged in agriculture and related activities, will not happen with increases in food crop

production unless there are allied industries to process and market the excess food. Increasing food crop production alone can only lead to a slum in the prices of products and lower incomes for farmers. Developing cotton as a major cash crop in northern Ghana has a better potential of reducing poverty. Already over 250,000 farm families are benefiting from cotton production. Cotton provides a source of employment as well as income security when food crop production fails. Cotton engages some of the youth and helps to minimize the rural-urban drift.

3.2.2 Land issues

3.2.2.1 Land availability

With the lowest density of population in Ghana, availability of land for cultivation is usually not a challenge for northern farmers and farmers interacted during field studies confirm that finding more land for cultivation is not a problem. 57.1 percent of the total land area of Ghana is suitable for agriculture and only 30.2 percent is currently under cultivation. The situation is however contrasted within Northern Ghana, with much higher densities of population in Upper East (higher than 100 / km2) than in other parts of the north.

Cotton is by far a more suited cash crop for the climatic conditions of the north as it is drought resistant and can stand the long dry spells. Northern Ghana belongs to the climatic zone of Northern Savanna (Guinea and Sudan Savanna woodland). The region has a unimodal rainfall distribution with a mean annual rainfall of 1,000 to 1,100mm and which gives it a single growing season in a year. The climate is hot and dry with average temperatures between 28.9 and 40C.

3.2.2.2 Soil Fertility

Soils in Ghana have predominantly light textured surface horizons in which sandy loams and loams are common. Lower soil horizons have slightly heavier textures varying from coarse sandy loams to clays. Many soils contain abundant coarse material either gravel and stone, or concretionary materials which affect their physical properties, particularly their water holding capacity.
The table below shows some average soil characteristics in the three regions:

Region	Soil pH	% Organic matter	%Total Nitrogen	Available Phosphorus (mg/kg soil)	Available Calcium (mg/kg soil)
Upper East	5.1-6.8	1.1-2.5	0.06-0.14	1.75-14.75	43.5-151.5
Upper West	6.0-6.8	0.5-1.3	0.01-0.07	2.0-7.4	52-151.5
Northern	4.5-6.7	0.6-2.0	0.02-0.05	2.5-10.0	45-90

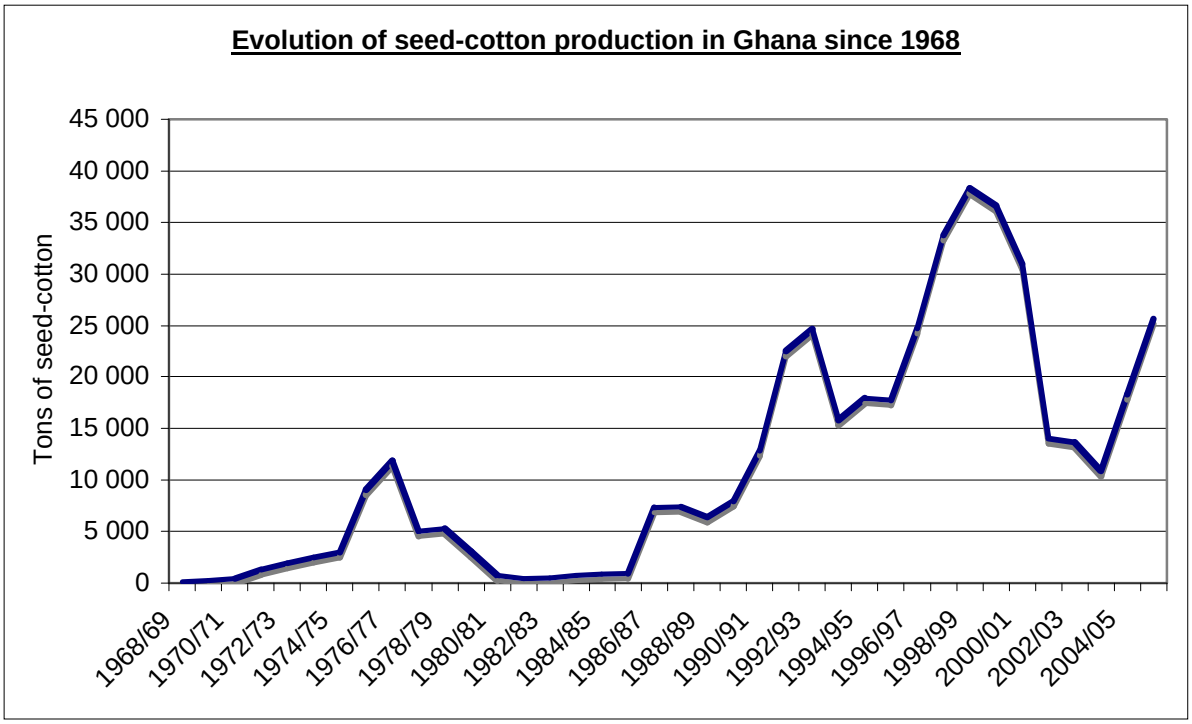
Source: Soil Research Institute, CSIR-Kumasi

The soils of the three regions are usually rather poor, with very low levels of organic mater and all major chemicals needed for any crop; therefore, to intensify and to obtain high yields require the use of important quantities of fertilizer and/or organic matter.

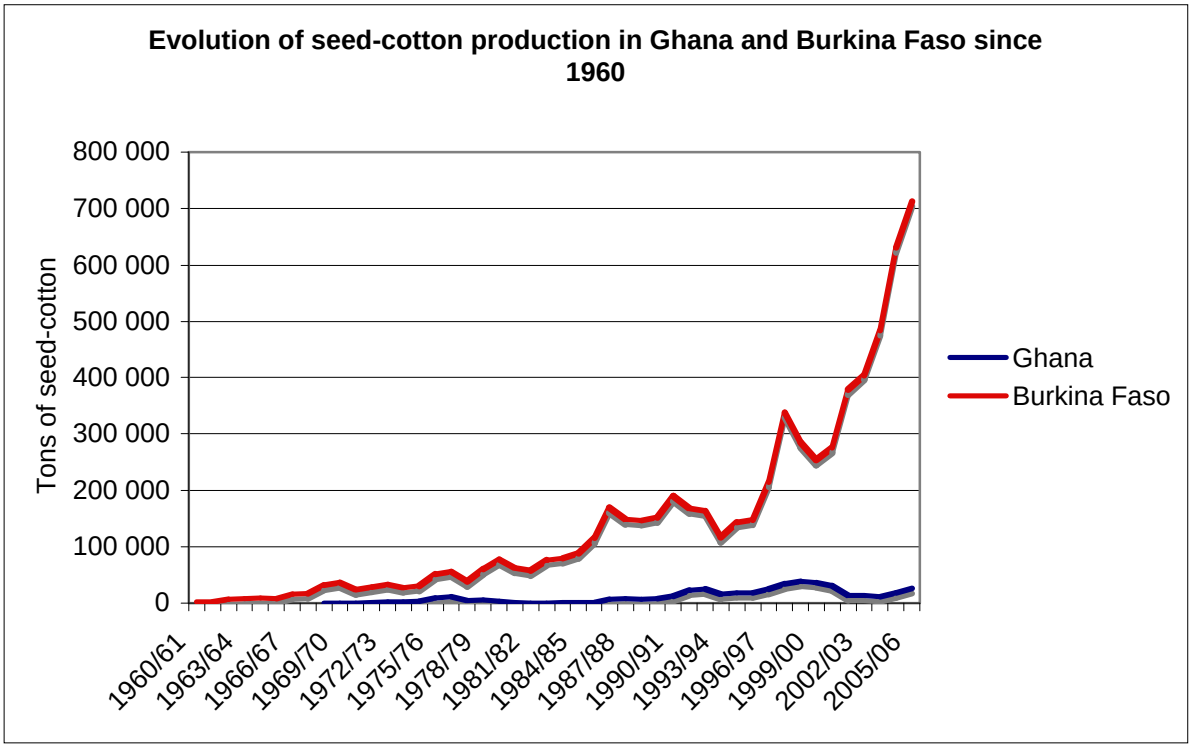
3.3 Evolution of cotton production in Ghana, comparison with other African countries

3.3.1 Evolution of production

The graph below (and Annex 2) shows the evolution of cotton production since 1968 ; it has always been rather erratic, contrary to the situation in neighbouring countries, where cotton played a major role in developping the rural populations ; the production never reached 40 000 T of seed-cotton in Ghana.



The comparison between Ghana and Burkina Faso is striking (graph below), Burkina is actually producing more cotton each year (since 2004) than the total cumulated production of Ghana since 1968 ! The comparison between other Western and Central African countries (see Annex 2) shows that Ghana lies far behind all cotton producing countries, even much smaller countries (Togo for instance) or countries where the natural resources are far less favourable than in Ghana (Senegal). Ghana cotton production amounts for less than 1% of the West and Central African production, although having excellent conditions for its development. Ghana is the only country in West and Central Africa that has not developped its cotton production and it is crucial to understand the causes of such a situation before desiging any new project aiming at rewamping this industry.



3.3.2 Causes to low production

The major reasons explaining this situation can be summarized as follows:

- Low involvement of Government (MOFA), changing policies and lack of regulation,
- Poor organisation of the sector, lack of confidence among the stakeholders,
- No or little development of animal traction, basis of the increase of the cotton cultivated area in other countries,
- Poor organisation of farmers, and low unattractive prices for seed-cotton.

A more indepth reason, linked to some historical origins, is that relations between cotton companies and farmers have not been, during a long period of time, relations between responsible and independent suppliers. Cotton companies considered farmers as land and labour providers, “temporary workers” who lended thair land and labour force to the them[4], and to whom the companies were providing the minimum necessary inputs for the cultivation of cotton (the companies also took care of the land preparation) ; the farmers would sell the seed-cotton to companies, at a price decided by the companies, with little relation with the cotton lint world price. This kind of relations does not promote reponsible behaviour among farmers, many of them still considering that there cannot be fair and trustful partnership betwwen them and the cotton companies. The behaviour of some companies (especially the “purchase companies”) has encouraged this kind of unresponsible behaviour, by helping the farmers to cheat and not repay the loans they had benefited for input supply.

The change of such way of thinking is a long term issue, and only fair and trustful policy will be able to set-up proper and normal relations between cotton growers and cotton companies.

[4] The name of several cotton companies « … Plantations », is an “illustration” of such way of thinking

The main lessons learned from neighbouring countries are that three main conditions have to be met in order to guaranty the long-term development of the cotton sector (apart from the fact that cotton should be a reasonably profitable crop for the farmers):

- Long-term transparent policy should prevail ; clear and enforced rules for all stakeholders are the only way to bring confidence among stake-holders,

- An efficient credit-based input supply system should be established enabling the supply of good quality inputs to the cotton growers, at reasonable cost and at the right time of the year,

- Fair and transparent seed-cotton price fixing system, enabling early payment to cotton growers,

3.4 Organisation, Institutions and functions within the cotton sector

3.4.1 Farming strategies/cotton motivation and socio-economic constraints of rural communities

3.4.1.1 Cotton vs. Food crops

As elsewhere in Ghana, agriculture in the north is characterized by small holdings of mostly food crops grown with the first objective to ensure food security of the household but also to raise cash incomes from the sale of extra food grown. About 90% of farm holdings in Ghana are less than 2 hectares in size.

Farmers in the north grow several crops. The major crops grown beside cotton are maize, sorghum, millet, groundnuts, cowpea, rice, yam and cassava. Intercropping is commonly practiced. Apart from cotton which is grown solo, farmers grow their food crops in various mixtures, sometimes as many as 6. Livestock especially cattle, sheep, goats, fowls and guinea fowls are raised in almost all farm households.

Interaction with farmers in a cotton growing village, Boli in the Wa Central District of the Upper West Region confirms the general trend and points to farmers growing as many as eight other crops beside cotton. Cotton appears to be third to sorghum and groundnuts in terms of area under cultivation in Boli in 2006.

Farmers' motivation for growing cotton is associated with all the other crops they grow. Farmers speculate on the most profitable crop on which to put greater energy. Several features of cotton cultivation constitute comparative disadvantage:

- It is a non-food cash crop
- It must be grown as a sole crop
- It is very labour-intensive especially at harvest time
- Its cultural practices are undertaken at almost the same time as staple food crops such as millet, groundnuts and sorghum
- It has high storage risk and cannot be stored to reap higher prices in the lean season since the price is fixed for a production season.

Cotton varieties grown are input-intensive and input (i.e. tractor services, fertilizers and chemicals) prices have been rising as that of seed cotton has been behind that of other crops. This is a discouraging trend. However, cotton farmers still register to grow cotton year by year. This apparent paradox is easily understood when one takes a few things into consideration:

Input supply for other crops

It has been observed that maize and to a lesser extent rice are the main beneficiaries of fertilizer diverted from cotton. The importance of maize however goes beyond food security to customary reasons. High input prices therefore do the change the habit of growing maize. Maize growing on former cotton fields profits from residual fertilizer effects.

One basic reason why farmers continue to grow cotton is the fact that the residual effect of the fertilizer applied to cotton is very much appreciated by farmers. In most cases maize is grown after cotton.

Guaranteed market

In more remote areas such as north of Yendi and Chereponi where access to market is difficult, guaranteed transport facilities and fixed prices appear to make cotton attractive.

Cash Security

Cotton farmers are aware that cotton provides them with incomes that they use to meet various needs that require bulk money. Some of uses of money from cotton cultivation mentioned during interactions include roofing of buildings, buying bicycles and meeting educational needs of children as well as marriage ceremonies.

3.4.1.2 Constraints to Cotton Production

Several issues were raised during interactions with cotton farmers, cotton companies and government as constraining cotton production in Ghana. These include:

Lack of credit

Cotton companies are highly indebted to the Agricultural Development Bank which is no longer refinancing. Cotton companies can no longer raise the needed credit to finance timely input supply to farmers and payment for seed cotton. Many companies have ceased production and the remaining four have reduced size of operation.

Late input delivery

Closely related to lack of credit is late delivery of inputs. Timing is critical for good cotton yield. It is estimated that everyday that planting is delayed translates into a loss of 15kg yield. The mission has gathered that a two-week delay in planting is common due to late ploughing by tractors.

Tractors are in short supply and even though other service providers are brought in from the south, they are still not enough leading to delays. These delays could be remedied with increased use of animal traction. Land preparation by tractor is also more expensive and could lead to compacting of the soil.

Some women also grow cotton on their own and appreciate incomes earned from cotton. However, frustrations with tractor services is said to be discouraging for some women farmers.

Poor quality seed

The cotton industry in Ghana depends on third or fourth generation seeds imported from Burkina Faso, Cote d'Ivoire and Togo. These planting materials are usually

unreliable. The purchase of recent generation and good quality seed from the neighbouring countries cannot be guaranteed and the conditions under which they are transported also contribute to the very low viability and vigour of the cotton seed.

Poor seed leads to poor germination rate, the possibility of two or more replanting and eventually results in lower plant population. Several fields observed during the mission point to this fact.

In order to solve this problem, the cotton companies requested the Savanna Agricultural Research Institute (SARI) to develop appropriate genetic materials for growing in Ghana. SARI has released 3 varieties: SARCOT 1, 3 and 5.
However, in spite of the attested quality of the SARI varieties, there does not seem to be any serious multiplication program in place. Low yields resulting from late delivery of inputs and poor seed is a major constraint to cotton cultivation. A combination of higher yields, sufficient producer incentives and improved marketing arrangements could certainly boost cotton production.

Poor Producer Price

Many farmers are deterred from growing cotton by low producer price. The producer price of seed cotton which stands at ¢3,000 has remained so for three years. This is not encouraging for farmers especially as cost of inputs has been increasing.

Inadequate labour

The cotton culture is labour intensive and especially more demanding during harvesting which is hand-picked and makes up about 60% of labour input. The weeding and thinning of cotton is equally demanding and account for about 30% of the total labour input. Table 6 shows the period that labour input is required and shows delays in almost all the activities involved in cotton production as well as overlapping of sowing and weeding of cotton and food crops especially in May and June. Picking of cotton also coincide with that of sorghum.

Farmers depend mostly on family labour and when extra hands are needed there is inadequate supply. The competition for labour between cotton and food crops is certainly a constraint to the expansion of the cotton as farmers usually give priority to food crops.

Inadequate education and extension services

Farmers' low literacy level and inadequate technical skills is widely acknowledged. Extension service on cotton production is left in the hands of cotton production assistants hired by the cotton companies. The CPAs have low educational level and are themselves hardly trained. Agricultural Extension Agents (AEAs) of MOFA who offer information on other crops are better trained and can give more technical information on cotton if a more collaborative role is defined. Both MOFA and cotton companies desire that this happen.

3.4.1.3 Attitude of farmers

Cotton companies accuse farmers of lack of commitment to cotton cultivation. However, farmers' attitude to cotton cultivation seems to differ with location. Farmers closer to Tamale are associated with lower yield while those in more remote areas closer to the borders with Burkina Faso and Togo have higher yield. These are influenced by the more serious cotton production in the neighbouring countries while those closer to Tamale have more economic opportunities and market for food crops.

Cotton cultivation is also seen by some farmers as the "Company's crop". This attitude may underlie the apparent lack of commitment that such farmers exhibit. Serious effort is required in education and improvement of yield to change this attitude. Farmers must want to make more money and improve their quality of life beyond the provision of basic household needs.

Farmers are still producing cotton for several reasons some of which include the following:

1. Most farmers do not consciously cost their labour, thus they perceive higher profits than indicated in the analysis.

2. Many farmers cannot get money to purchase fertilizers for a very important crop such as maize and the only way out is to cultivate cotton and have access to fertilizer and other crops.

3. It is also by producing cotton that most farmers have can have access to tractor services for the cotton and other crops.

4. Cotton production affords farmers to get bulk money. This is particularly important to young people who want to buy assets such as bicycles, radios, furniture etc.

5. If they do not produce cotton to sell for money, they will be forced to sell food crops at very low prices during the harvesting season.

6. Farmers remember the not too far past when cotton production was very profitable and are hoping that cotton prices will improve in the future.

The cultivation of seed cotton contributes to the cash security of farmers. Cash security level was assessed in a study conducted around Nyankpala, 20km west of Tamale in year 2000. Households were asked which amount they needed to satisfy their basic needs and their income and expenditure was registered for 12 months.

It is clear from the foregoing analysis that farmers' economy is improved through the cultivation of cotton and will be enhanced even more when the farmer is encouraged to expand holdings in cotton and adopt practices that favour higher yields.

3.4.2 Analysis of farmers' organizations and relations with partners

The use of farmer-based organizations has become a popular strategy for extension and especially for micro credit schemes where group solidarity and responsibility have worked to ensure better repayment rates. The success of this strategy rests on relative social cohesion. Northern Ghana abounds with various commodity groups.

Cotton companies have also adopted the strategy of working with farmers as small producer groups within communities instead of individual farmers and to use group responsibility to retrieve debts of defaulting members. Farmers are asked to choose their own group members and many of them have chosen family members and close allies. Some farmers interviewed said they looked for people they could trust. They also select a chairman, secretary and treasurer.

The sizes of these cotton producer groups (CPGs) vary from as small as three members to as many as fifty or more. One group in Bunglung headed by the chief was made up of 58 people. These cotton producer groups at the community level are informal, unregistered and only seem to be loosely linked to Cotton Farmers

Association. The CPGs play active role in monitoring of input supplies. They perform the following functions:

- Conduct initial screening of members for registration by cotton companies
- Monitor cotton production activities of members
- Receive farm inputs from companies for onward distribution to members
- Record data on land preparation, farm inputs and seed cotton marketing for use by cotton production assistants
- Contribute to pay any outstanding debts, should any member default.

The cotton producer group relates to the cotton company through zonal officers and cotton production assistants (CPA) contracted by the cotton company to register farmers and groups, oversee input supply and application and offer general information on cotton.

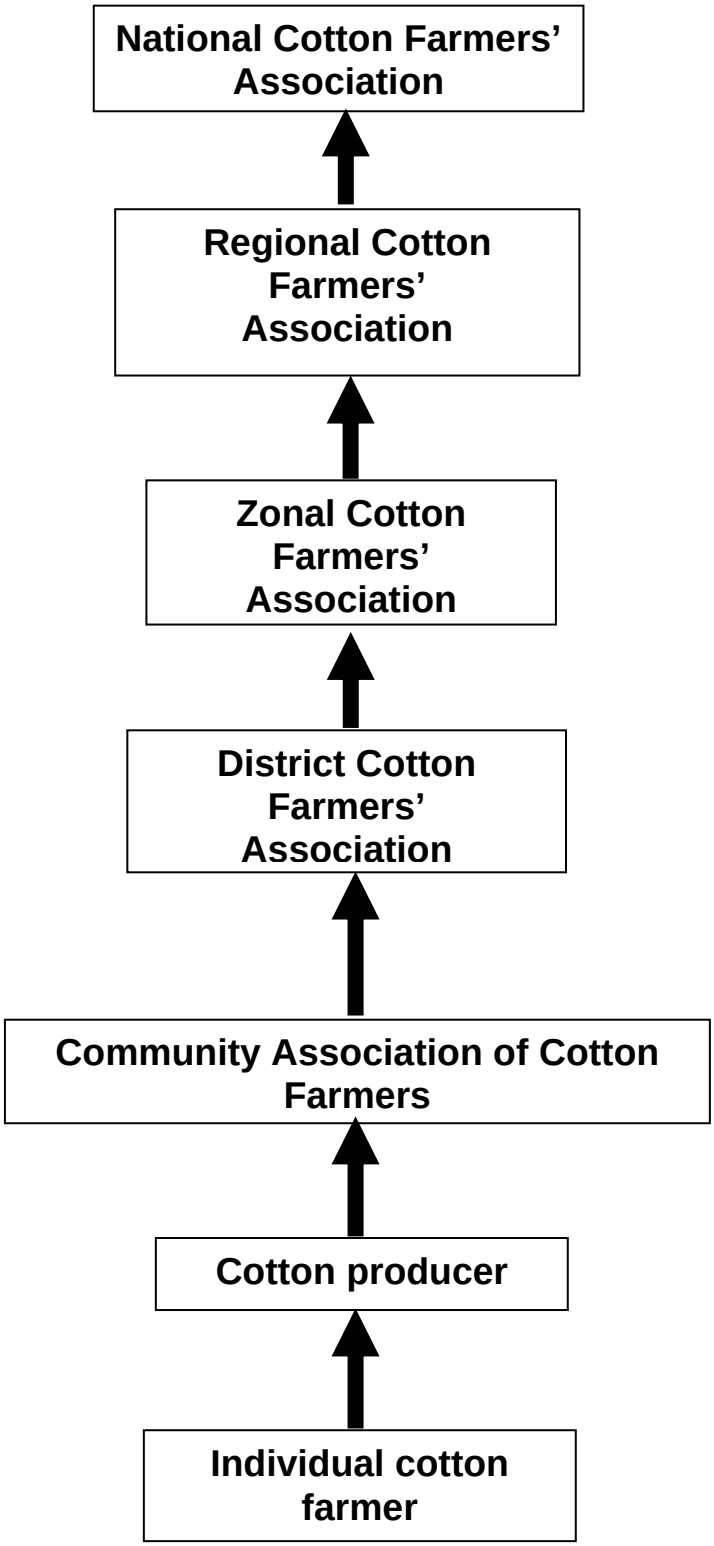
Deliberations with some executive members of the National Cotton Farmers' Association (NCFA) revealed that the NCFA is a body formed in 2000 at the national level with the help of the Ministry of Food and Agriculture and is represented at regional, zonal and district levels in the three northern regions. At each level, an Executive Committee made up of a core of Chairman, Secretary, Treasurer and some trustees steer the affairs of the association. This body is also linked to the Apex Farmers' Organisation of Ghana (APFOG) on which the Vice Chairman of the NCFA serves as the General Secretary. APFOG is an umbrella body of all farmer-based organizations in Ghana.

Though the National Cotton Farmers Association seems to be well structured, it does not seem to be active as its meetings are adhoc and few. It is weak on the ground and needs to be strengthened and made more responsive to the needs of farmers. For instance, cotton farmers in one area whose farms got destroyed from the use of a particular insecticide supplied to them reported to the District Director of Agriculture but did not consider reporting to the association.

Farmers and cotton companies alike confirm that the group strategy is good and has had a positive impact on loan recovery. The groups however, need to be developed further into stronger, self-supporting groups that can in future be able to source for their own funds and inputs. This will require reorganization of the groups to workable sizes, formalization and linkage to the national body through community level representation of the association. Expanding the structure to something like the figure below could be a good beginning.

Groups need to be regularly trained to define their objectives, review their commitment, set targets and work towards achieving them.

Though MOFA staff is well trained in group formation and dynamics, the cotton producer groups have not been trained and are not guided by any set principles. Issues such as how to deal with defaulting members and how to resolve conflicts have not been defined. This constitutes a big gap that should be filled.



Standing Committee on the Development of Cotton Industry in Ghana

To help address the issue crippling the cotton industry and to move it forward, MOFA has set up the Standing Committee on the Development of the Cotton Industry in Ghana. The newly formed Standing Committee is to regulate and guide the cotton sector along the whole value chain, from production to the consumer. The specific terms of reference of the Standing Committee are to:

- Look at and deal with complaints and grievances by stakeholders
- Deal with request/applications for allocation of zones from new companies or existing ones using established criteria

- Come out with a code of ethics on operations, including sanctions against defaulters
- Review environmental, social and economic factors to make the industry viable.
- Look at any other issue which may facilitate the smooth development of the sector

As part of its initial activities, the Standing Committee has identified and defined the roles of all stakeholders within the industry as presented in the table below.

Stakeholders within the cotton industry and their roles

Stakeholder	Role
Farmers/Farmer Groups	- Primary producers of seed cotton - Producers of certified cotton seed (for planting) - Providers of land - Providers of traction equipment (in some cases) - Participate in price negotiation
Cotton Companies	- Facilitation of farmer identification, registration and group formation - Pre-finance production (negotiate for credit sources, input acquisition and distribution, land preparation) - Extension training and technical backstopping (supervision on the field etc.) - Co-ordination and monitoring field activities - Price negotiation - Field purchasing (seed cotton and cotton seed) and loan recovery - Produce evacuation from farm gate (transportation) - Ginning and classing/sorting - Identification of brokers - Marketing/Export
Financial Institutions	- Provision of credit
Research	- Seed development (breeder seeds and foundation seeds) - Agronomic practices - Provision of training (farmers, MOFA staff, cotton companies) - Undertake classing - Undertake socio-economic studies on impact of cotton production on farm families; environmental assessments/impacts of cotton production - Test efficacy of agro-chemicals
MOFA	- Extension and training - Certification of seeds - Policy development/ decisions - International trade negotiations (WTO etc.) - Facilitate price negotiations - Source/ initiate bilateral and multilateral agreement
Development Partners	- Facilitate and finance multi-stakeholder processes - Provision of technical backstopping / technical support - Advocacy role (e.g. Fair trade advocacy)
Input Dealers	- To ensure timely availability of essential inputs
Textile Industries/ Brokers/Processors	- Absorb all lint and commercial seed

The Standing Committee is also discussing the revision of the zoning strategy and defining what a cotton company should be. The following are some of the outcomes so far.

The cotton company is defined by:

1. The company's legal status. The company must be legally registered and one of the operations should be cotton production. (The deed of incorporation should include cotton production, inputs and processing)
2. Investments over the years: the company must have assets, ginnery and development programs
3. The ability of companies to meet farmers' basic input requirements in time for cotton production for at least 1000 units (500 ha).
4. Evidence of financial capacity (letter of assurance from financier)
5. Length of period of operation

The potential of zones will also be determined by:

- 1 000 farmers or more (interested in growing cotton)
- Number of units in the base year of 2005
- Acceptability of the company by farmers for existing companies (track record on companies performance)

The committee will assess annually the target of each company, average yield, actual achievements, problems and reasons for variance.

The Standing Committee could be developed into an inter-professional body where all stakeholders are represented.

The table below summarizes the roles and functions undertaken by the main stakeholders in the cotton sector:

Functions	Farmers	Cotton Cnies	Input suppliers	ADB	SARI	Tractor owners	Transport Cnies	Lint traders
Fixation seed cotton price	X	X						
Input supply		X	X					
Financing of Input supply		X	X	X				
Land preparation	X	X						
Cotton production	X					X		
Research and seed production		X						
Extension services		X			X			
Transport of seed cotton and lint		X					X	
Quality issues and lint classing		X						
Financing of Seed cotton purchase		X						X

3.4.3 Financial Institutions and micro-credit mechanisms

Production of most smallholder cash crops in Sub-Saharan Africa requires use of some purchased inputs; seed, fertilizer or crop protection chemicals. General decline in input use has been attributed to:

- High prices due to removal of subsidies following liberalization

- Inadequate distribution networks in remote areas since cost of supplying small quantities to small farmers by private traders is prohibitive

- Only a small minority of smallholder farmers retain sufficient savings to buy suitable quantities on inputs on a cash basis at the beginning of the growing season. The majority of farmers require credit if they are to be able to take advantage of the income earning opportunities offered by input use.

Provision of seasonal credit to smallholders is fraught with difficulties. In many cases, private traders have been reluctant to get involved in supplying inputs where it may also mean providing credit in order to generate an attractive volume of business.

Credit to buy inputs is therefore one of the most significant obstacle to smallholder cash crop production and in cotton cultivation where use of inputs is critical and expensive, access to credit for input supply is crucial.

In Ghana the bulk of loans and advances from commercial banks have progressively gone to the Commerce and Finance sectors, followed by manufacturing and services. From 1991, loans and advances to the agricultural sector have declined consistently and apart from 2001, has performed worse since 1999. In average, the banks provide less 2% of their loans to the agricultural sector, and prefer to finance other sectors like trade, finance, services etc.

Secondary banks have performed better in terms of loans and advances to the ctor although they also provide for services to the commerce and finance sectors and manufacturing. However, no secondary bank is at the moment involved in the financing of the cotton sector.

Lending rates to the agricultural sector has not been significantly different from the Export or manufacturing sectors and have in fact been comparable from 2001 to 2004. There are 116 Rural and Unit Banks and a number of non-bank financial institutions operating in rural and peri-urban settings. These are engaged in deposit mobilization and loan/advance delivery and are helping the agricultural sector

<u>Agricultural Development Bank</u>

ADB is the only financial institution that supports the cotton sector; by providing credit facilities for the cotton companies to enable them extend input credit to farmers. These operations have run into debts of about 130 billion Cedis. ADB has since 2000 ceased to advance further loans to cotton companies except Ghana Cotton Company for which it has done a debt-equity swap and now owns about 78% shares in GCCL.
ADB is looking for a strategic investor to take over GCCL but in the mean time it is company and is hopeful for recovery with better management and increased production.

Since the adoption of input credit delivery to producer groups instead of individual farmers, cotton companies attest to improvement in loan recovery. This provides a good indication that a micro-credit scheme based on group solidarity and cohesion could work for cotton as for other crops.

A scheme whereby the Rural Banks manage a fund set up to support input acquisition for cotton production and disburses to registered farmer producer groups with guarantees from cotton companies who pay farmers through the bank could work and should be tried. This would free companies of debt burden and the bank would deduct the input credit before crediting the group's account with their revenue. Discussions during the mission with Bonzali Rural bank in Tamale, the cotton companies and some farmers on the idea was favourable and therefore should be studied further and details worked out and tried.

Such a scheme would however require stronger and more cohesive groups formalized through registration with the Department of Cooperatives.

3.4.4 Recommendations

The foregoing discussion has provided some highlights on developments in the cotton industry focusing more on issues at the farmer level. It is apparent that there are many areas that require urgent intervention to promote the industry. A few specific recommendations are summarized as follows:

1. Farmers require a lot of education to value cotton production as potential major source of income. They must assume complete ownership of the operation and be empowered to increase production. This education can be done through their own associations and MOFA. The farmer groups need to be strengthened at all levels. Training on group formation, dynamics and development should be an integral part of building the capacity of the farmer associations.
2. The Socio-economic unit of SARI could be empowered to carry out regular studies into farmers' livelihoods, cultural and social factors that inform and influence their behaviour and attitudes as well as the economic implications of these.
3. All stakeholders in the industry need to be guided by strong appreciation of their interrelated roles. Conflict in role definitions and expectations must be resolved to enhance performance. AFD could support the work of the Standing Committee or an inter-professional body to work towards role enhancement for the promotion of the entire sector.
4. Inadequate input credit is crippling the industry. A revolving fund to support the timely provision of inputs for cultivation will improve yields as it will remove the delays in land preparation and planting. However, as an immediate step the government could facilitate a negotiated deal between ADB and the four cotton companies who are operational to be funded to provide input credit to more farmers.

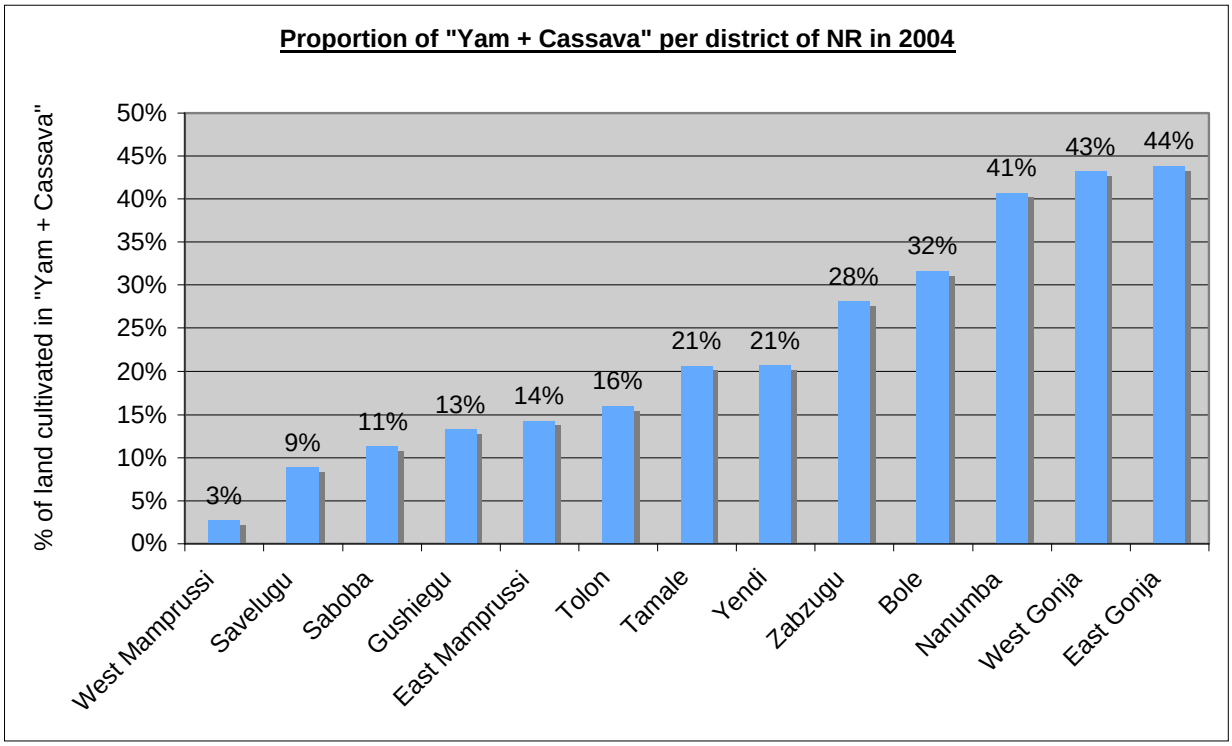
3.5 Farmers and farming systems in Northern Ghana

There are unfortunately no statistics and very little studies about the cotton growers in Ghana, and there is little data about the farm households in general ; data about cotton production are not recorded by the RADUs and data per district related to cotton production are not available.
It is therefore impossible or very difficult to analyse the characteristics of the cotton farms and to compare them with other farms. Food crops data is available at regional level and a comparison between district has been undertaken in Northern region (Tamale), in order to try to identify different kind of zones within the region.

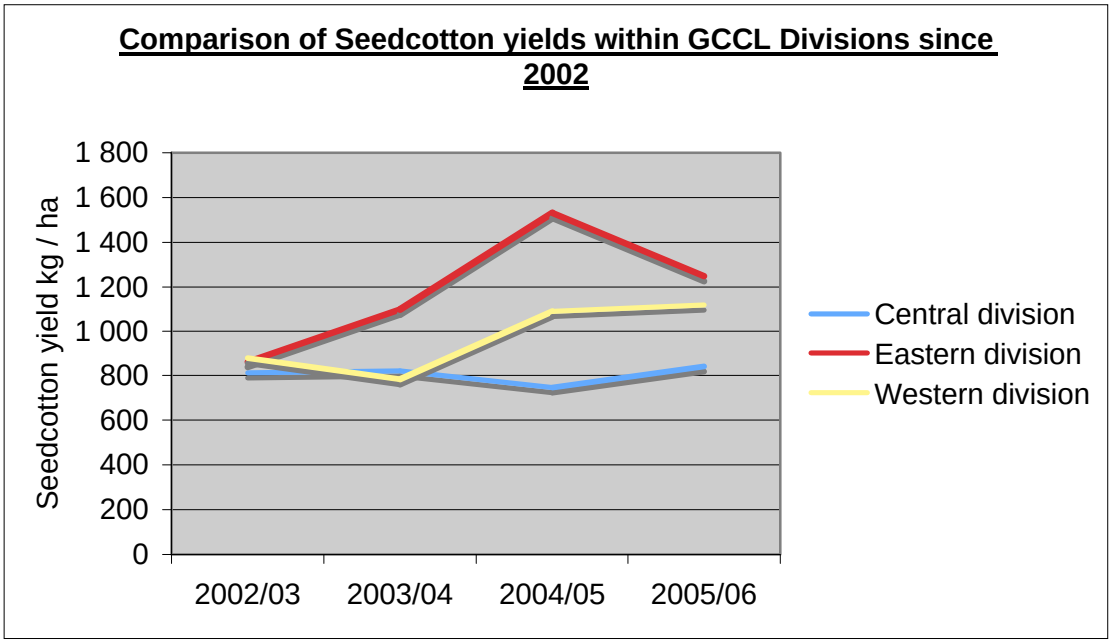
From the figures related to the kind of crops grown in the region for each district, it appears that this a big difference between the south and the north of the region if one compare the proportion od "tubercules" (mainly yam and casava). In some of the

districts, farmers grow more than 40% of the cultivated land in yam and casava, when those crops amount for less than 15% in others.

The Annex 3 and graph below shows the proportion of yam + casava grown for each districts in 2004 (source : RADU Tamale annual report) :



The Northern region is definitely very heteregeneous in terms of production system, and is has important consequences for cotton development. From experience and observations, it appears that cotton are less attractive for farmers when they have alternative cash crops, which is the case in zones where the soils and climatic conditions are suitable for yam and casava. This is the situation in the south of the Northern region, where cotton has never been really able to develop and where there has always been the most important problems of bad repayments of loans for inputs. In this kind of zone, animal traction is also almost inexistant and farmers rely entirely on cotton companies for land preparation. This kind of zone consequently shows the lowest yields, as shown in the graph below, where are compared the seed-cotton yields of the three divisions of GCCL, the Central division covering the centre and south of the Northern region :



In terms of systems of production, the biggest potential for cotton development lies more in Upper East, Upper West and the northern part of Northern region.

The importance of cotton in the north of Ghana can be assessed through the proportion of cotton growers among the total number of farmers ; the cotton companies provide data about the number of cotton growers, but there are no data about the total number of farm households. It can however be estimated through the rural population and the number of active population involved in agriculture activities, both information being available in the population census (Year 2000).

From the census, it appears that a population of about 1.2 million can be considered as active in the agriculture sector ; if we consider that the average size of a farm is about 6 active, the total number of farm households in the three Ghana northern regions is about 200 000. The average number of farmers having grown cotton during the last 5 years amounts for about 33 000, i.e. 16.5% of the total number of farmers. The cotton production is therefore not a major crop for the three regions, although there are probably major discripancies between regions and districts. For instance, it is likely that cotton is much more important in Upper East than in the south of Northern region.

3.6 Seed cotton production issues

3.6.1 Agricultural research and extension

3.6.1.1 Agricultural research

The Savanna Agricultural Research Institute (SARI) at Tamale conducts research into all aspects of cotton production. Also at Tamale, the University for Development Studies (UDS) conducts socio-economics research, notably in relation to cotton production. The University of Ghana (Soil Science Department and Department of Geography and Development studies) at Legon, the Environmental Protection Agency at Accra, the Soil Research Institute (Council for Scientific and Industrial Research) at Kumasi and the University of Science and Technology (Department of Crop Science), also at Kumasi, contribute through studies to an improved understanding of the cotton region's environment or conduct experiments for soil

conservation or into innovative cropping systems (direct sowing). Only SARI and UDS were visited by the mission.

The SARI centre is located at Nyankpala, 20 km west of Tamale. It has about 1000 ha of land and testing stations are distributed over all the agro-ecological zones of the three northern regions: Manga, Damogo, Yendi, Salaga and Wa. About 35 scientists and a hundred technicians are involved in the different plant programmes. The overall goal of SARI is to put a system in place to respond to the needs of the farmers and to increase their production and incomes. SARI coordinates the activities of the Research-Extension Linkage Committees in the northern regions.

The cotton programme has had up 10 scientists working at different times in the fields of genetics, agriculture, entomology and socio-economics. During our visit, only two scientists were present, including the geneticist (Dr Marshark S. Adbulai) who received us. Two scientists are undergoing long-term training in the United Kingdom (one geneticist and one entomologist). The second entomologist of the programme was named Director of SARI. Finally, four scientists resigned – two agrologists and two socio-economists – to join other institutes. There is thus a real human resources problem and the continuity of the programme, as well as the scientists' motivation, remains a matter of concern.

Within this context, only the programme for varietal selection has displayed a certain continuity and has arrived at a few tangible results. The varietal problem is acute in Ghana and the programme is therefore very relevant. It consisted of:

- the creation of a collection of genotypes of diverse provenances;
- the evaluation of these varieties in Ghanaian conditions;
- comparative studies in actual conditions of some varieties from this collection, selected for their results.

Research was conducted on three varieties of the collection, renamed SARCOT 1, SARCOT 5 and SARCOT 9 and tested in a multi-location network from 2000 to 2003. Some results were astonishing, for example, SARCOT 5 which was longer and with a best strenght than the FK 290 variety.
The multiplication of these varieties can be continued, while verifying these results, notably from the perspective of their technological properties.

No result was shown or communicated to us in other domains of cotton research.

3.6.1.2 Agricultural extension

In principle, agricultural extension is the responsibility of MOFA in each cotton-growing region. But given that cotton is not the most widespread crop, there are no specific extension programmes for it. Overall, there is about one development agent for every 1500 cotton farms.

As in the cotton-producing systems of neighbouring countries, it is the cotton companies that provide cultivation assistance, with a development agent to grower ratio better than that of MOFA: one agent for 500 growers. Essentially, these agents enumerate grower groups and take care of input needs. An extension effort was launched for phytosanitary control which is now conducted by the growers themselves under the agents' supervision.

3.6.2 Agronomic issues

3.6.2.1 Seed cotton yield

Figure 1 shows the changes in national mean yields for Ghana and neighbouring countries. The yields in Ghana are lower than those in Benin, and even those in Burkina Faso, where the pluviometry is less favourable. These gaps are not narrowing. However, one must note that the figures for the national mean yields are

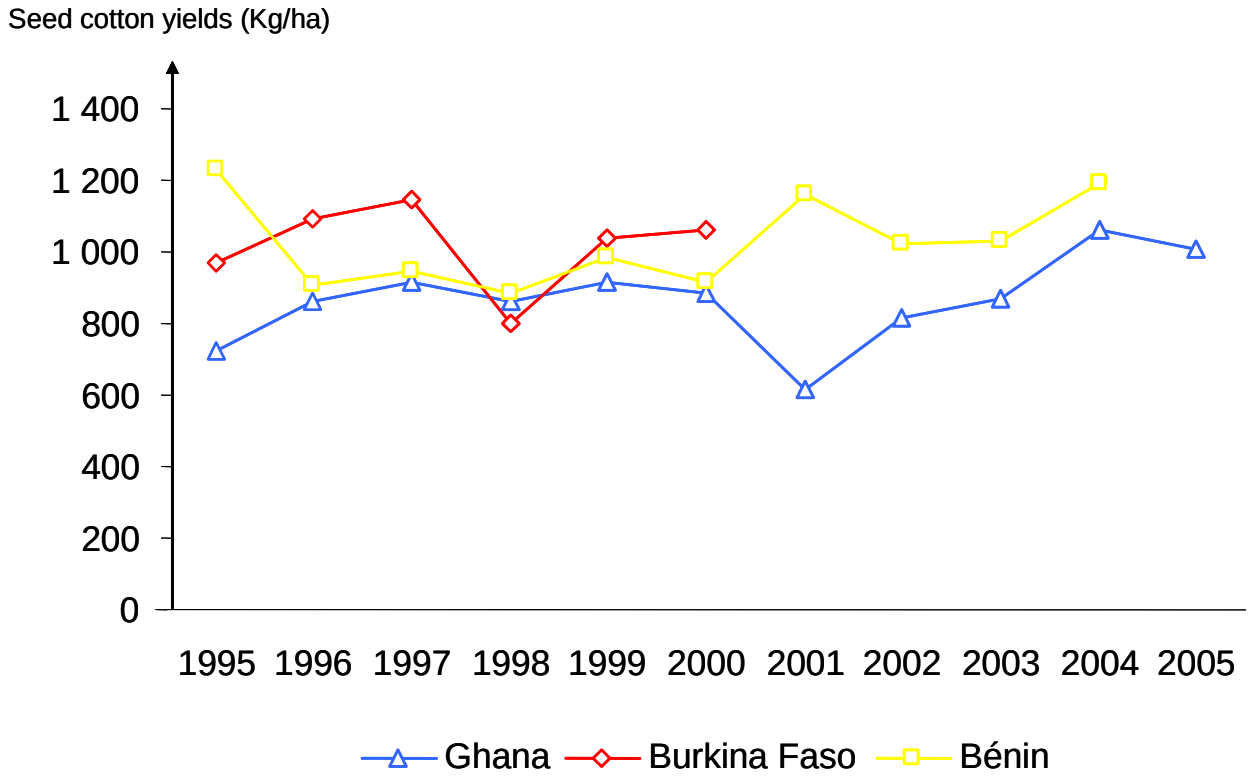


Figure 1: Comparison of changes in seed cotton yields

not very reliable because the actual area under cultivation is not easy to assess; the inputs distributed for cotton cultivation can be and are often used for other agricultural purposes.

3.6.2.2 Parcel visits

Cotton parcels were visited in the vicinity of Tamale with the Ghana Cotton Company, in the village of Ando Nyamanu, close to the Togolese border, with Nulux and in the vicinity of Wa with the Plantation Development Company.

The first technical constraint that became apparent was the sowing date, often late. Some parcels visited seemed to have been sown quite early, end-May or beginning-June, and were at the stage of the formation of the first capsules. These parcels thus presented good production potential. Taking into account the period of the visit (mid-August, i.e., about 80 days after the start of the rainy season), this was a stage of development that should have been widespread. But most cotton parcels were at a less advanced stage. Some parcels were even observed to be at the four-leaf stage, whose sowing must have taken place at the end of July. It is known that the production loss is, on the average, 15 kg of seed cotton for every day of sowing delay beyond the optimal date, which we can fix at mid-June for the regions of the extreme north (Upper West and Upper East Region) and end-June for the Northern Region.

This late sowing is due to motorised tilling, itself delayed because of an inadequate and antiquated tractor fleet. The farmers are conscious of this: they cite the delay in

tractor tilling as one of the reasons affecting production. The farmers of the Ando Nyamanu village even mentioned that when they were sowing their crops, those in Burkina Faso were already in place, even though the pluviometry there is less favourable.

Another problem created by motorised tilling is that of soil erosion. Almost everywhere in the fields ravines are created and soil stripping is visible. On old parcels and those frequently worked on by tractors, problems of cotton rooting due to an iron pan arise. On the stripped areas, we can observe that emergences are poor or nonexistent. Nevertheless, the farmers never cite soil fertility as a production constraint.

The problem of tilling will be taken up later in the specific topics.

The second production constraint in the field is poor phytosanitary control. Numerous attacks on blossom buds and flowers were observed. On the average, one plant in five displayed holey floral organs or shedding, probably of phytosanitary origin. Leaf damage was also present. *Earias spp* and *Helicoverpa armigera* caterpillars were frequently observed.

The farmers are also conscious of this and blame the distribution of outdated or ineffective supplies as a production constraint. In fact, a farmer showed us a bottle of Polythrin C whose expiration date was well past. Still, it would have been difficult to find out this bottle's origin. In the market of the same village, insecticide products for cotton were freely available. There are almost as many phytosanitary treatment programmes as there are cotton companies in the region, which, in such a small area, is not justifiable. Some programmes consisting of five applications with the same product (mixture of cypermethrin and profenofos) are unsuitable for the infesting parasitic facies, mainly because of the resistance that *Helicoverpa armigera* is developing in western Africa against pyrethrinoids and cypermethrin, in particular. The GCC recommends a programme that is more suitable, including two initial treatments with endosulfan to limit the population of resistant caterpillars, as is now practiced in all neighbouring countries.

After our visits, it became clear to us that these two constraints are the most significant. We also noticed plant density, often too sparse; we sometimes observed that there had been several re-sowings. But poor emergences are common in areas where erosion is severe, so much so that the quality of seeds cannot be the only cause.

Insert PDF Photos 1

Insert PDF Photos 2

We noted that the parcels we visited were well maintained, in particular with good thinning and weeding. Some foliar symptoms of mineral deficiency were observed, mainly concerning nitrogen.

3.6.2.3 Quality of seed cotton

The quality of the harvested seed cotton influences greatly the quality of the fibre obtained after milling. And, obviously, the seed cotton quality depends to a great extent on the cultivated variety. But cultivation techniques and the care taken during harvesting have also significant impact on the quality of the final product. The mission's period was such that we could not observe harvesting operations, nor the presence or absence of cotton whitefly or aphids at the end of the cycle. The latter can lead to sticky cotton or mould development. We learnt of the harvesting procedures commonly used, not very conducive to preserving quality, but were unable to observe how widespread these procedures are. However, late sowing and inadequate phytosanitary control remain the major cultural reasons that can impact seed cotton quality.

3.6.2.4 Conclusions

Based on our field visits, we consider that two major agricultural constraints limit yields: late sowing and inadequate sanitary control. Each of these two factors can explain yields lower than those in neighbouring countries. We also noted planting density that is not uniform with missing plants or re-sown ones, attributable either to crop seed quality or to soil erosion problems. These constraints can be easily overcome with suitable technical support.

3.6.2.5 Recommendations

1) Test and implement alternatives to motorised tilling.
2) Harmonise the different recommendations for the applications of phytosanitary control and verify their effectiveness.
3) Implement a system for cotton seed multiplication.

3.6.3 Specific technical issues

3.6.3.1 Alternatives to motorised tilling

The harmful consequences of these cultivation methods have been mentioned. The quasi-systematic recourse to motorised tilling, most often using tractors from cotton company fleets or private tractors, has led to little development in the use of animal draught farming in Ghana as compared to neighbouring countries. Moreover, until recently, the area under cotton cultivation in Ghana was small and its low profitability did not permit growers to invest in animal teams to any large extent. Finally, the prices set for tractor tilling are low: 180,000 cedis per unit (0.5 ha), i.e., approximately 10,000 FCFA, which is equivalent to the price of tilling using animal power in Cameroon. This does not encourage the producers to equip themselves with animals. This price cannot cover all the expenses of running a tractor, and most certainly not its depreciation; the tractor fleets simply cannot be renewed and soon fall into disrepair, thus limiting the expansion possibilities of the area under cotton cultivation. Sowing is susceptible to ever increasing delays, compromising yields. It is in such a context that alternatives to motorised tilling should urgently be implemented.

Distribution of animal draught power

Animal draught power is an alternative that has proven itself in neighbouring countries.

Availability of animals and implements

In Tamale, there is a company that sells implements for use with bovine or asinine draught power. According to a census by MOFA Northern Region, the cattle husbandry is sufficiently developed to supply adequate numbers of draught animals.

Profitability of animal draught power at the grower level

Most often, studies into the profitability of animal draught power compare economic results between manual cultivation and animal-assisted cultivation. Hesse and Runge-Metzger (1999) conducted such a comparison in North Ghana and could not arrive at a conclusion that animal-assisted farming is more profitable. But, in our view, these studies are difficult to conduct because of the amount of data that has to be acquired (family size, cultivated area, total production obtained, etc.) and, often, the number of sample farms monitored is too small to fully represent the wide prevailing heterogeneity of these quantities, and basing comparisons thereon is unreliable.
Another method, much simpler, consists of calculating the time it will take for an animal team to pay for itself by tilling. This is closer to reality in conditions prevailing in Ghana, because irrespective of whether the animal team works on the farm or elsewhere, the savings in cost are those of tractor tilling, costs that are clearly defined. Moreover, cattle draught tilling is identical, even more, that the cost of motorised tilling. A pair of oxen costs 5 million cedis and a plough a little less than 1 million at the Tamale company. An animal team can easily till 5 hectares per year. Thus, in four years, the animal team pays for itself.

The difficulty lies more in the financing of the purchase of the animal team rather than on its payback period. Another problem is the risk of theft of draught animals, which is fairly common as we learnt, and the risk of mortality of the animals. If not eliminating them altogether, the adoption of animal-marking techniques and improved health care can at least reduce these risks. As to medium-term credit, while it is desirable and envisageable for the implements, it has been a total failure wherever tried for financing the purchase of draught animals, mainly due to the difficulty of recovering annual instalments.

Asinine draught power is less expensive than bovine draught power and can be considered as an interesting alternative for those farmers who cannot purchase draught oxen. An ass costs less than one million, i.e., one fifth that of a pair of oxen. However, while cattle have value at the end of their careers, the ass has none. The profitability of asinine draught power is better than that of bovine draught power: an asinine team can work 2 to 3 hectares per year and can be purchased for about one-third the cost of a bovine team.

Replacing tilling by the use of herbicides

In North Cameroon, the technique of direct sowing with the use of herbicides has developed mainly in a context of a shortage of draught teams. This technique's advantage is that cotton or maize can be sown early without waiting for the availability of a draught team and thus retain the potential of full production. It requires no investments and consists of eliminating weeds by spreading a total herbicide (glyphosate) and to sow without tilling the soil. The dose is of 3 to 4 litres of Rundup (360g/l of glyphosate) per hectare depending on the amount and species of weeds present. In Cameroon in 2006, a litre of Rundup was sold to farmers at 1600 FCFA,

i.e., 30,000 cedis. We can complement this treatment with herbicides specific to the damage: Diuron on cotton or Atrazine on maize. Commelina presence necessitates the use of Atrazine on maize preceding cotton.

Direct sowing under cover

The use of direct sowing under cover methods (DCM: Direct sowing, mulch-based systems and conservation agriculture) are spreading in the northern Cameroon and southern Mali. These methods consist of not tilling the soil and letting it remain covered permanently by mulch or live plants. The lack of mechanical soil tilling is compensated for by the reactivation of the biological life which improves the soil's physical fertility. The advantages of these systems are reduced working time, improved soil fertility due to reduced erosion and an increase in the chemical, physical and biological fertility of the soils. However, a certain level of expertise is required to control weeds and parasites, and to ensure an adequate nitrogen supply to the crop. Their use requires a significant investment in adaptive research and especially in extension activities.

Conclusions

Alternative technical solutions to motorized tilling exist and have been proven to work in similar conditions in neighbouring countries. They have to be demonstrated and encouraged, their dissemination organised and facilitated (seasonal financing for herbicides, medium-term credit for draught-animal equipment and implements, organisation and dissemination of veterinary information and care and of techniques of marking oxen). It will also help if the price of motorised tilling approaches its true cost at the same time as the alternatives proposed here are implemented, to make the latter more attractive.

3.6.3.2 Phytosanitary issues

As far as phytosanitary control is concerned, recommendations should be harmonised and should take into account sub-regional recommendations for treatments for limiting the resistance of *Helicoverpa armigera* to pyrothrinoids (respecting the two usage windows in association with products with endosulfan to limit the resistant populations).

Tests of the three levels of phytosanitary protection (no protection, recommended protection and maximum protection) can be used to measure the efficiency of the extension programme and constitute the minimum monitoring necessary for their evaluation and possible adaptation. They are not very complicated to implement and, if not done as part of research activities, can be implemented directly in a research/development framework.

3.6.3.3 Varietal and seed issues

There are two goals as far as seed production is concerned: the distribution of an adapted high-yield variety that gives good quality fibre and the supply of quality seed with good emergence, thus leading to good crop density in the field. Currently, Ghana has not established its own system of seed multiplication. Seeds of the Burkina Faso variety are regularly purchased and introduced in Ghana. Ghanaian research offers varieties which, even though they may have been imported, can, depending on their evaluation, form the basis of a national multiplication scheme. Unfortunately, this research project was interrupted this season because of the lack of ability to gin the three tonnes of seed cotton that resulted from multiplication tests of the three varieties offered for agricultural pre-extension. This small amount was intended to be ginned

on the 20-saw mini-gin which the cotton research project owns (some twenty hours of ginning). It is, admittedly, difficult to gin such small quantities of seed cotton in a mill.

The establishment of a seed multiplication programme at the national level will allow:
- saving of the substantial expense of importing seeds;
- better control over the quality of seeds supplied to growers;
- elimination of the phytosanitary risk associated with imported seeds;
- better control over the varietal choice.

Recommendations for the establishment of a seed multiplication programme were made during an earlier mission (Dessauw and Mennozi, 2000).

As far the possibility of introducing genetically modified varieties of cotton is concerned, the recent experience in South Africa, India and China show that this technology is not profitable in case of low-intensity cultivation. Moreover, the introduction of GMOs in Ghana is not recommended in the current production conditions. The establishment of a seed multiplication programme would also avoid supply problems for traditional varieties that would arise if Burkina Faso were to shift to a GM variety of cotton.

3.6.3.4 Conclusions

Mean yields in cotton cultivation in Ghana are lower than those in neighbouring countries because of the technical problems identified here and for which solutions can be tested. The persistence of these problems calls out for the establishment of a research and development approach, a topic which we will expand upon in the recommendations.

3.6.4 Economic issues

3.6.4.1 Prices of different agro-outputs and -inputs

The role of the States in fixing agricultural prices has continuously diminished and market forces or inter-party negotiations now largely determine prices. The State no longer fixes the prices of food crops and intervenes in the market to reduce variations in prices only to build up security stocks. Nevertheless, the volume of national imports of cereals that the State controls can and does still impact food crop prices. The seed cotton price is fixed every year in most countries within the trade, in principle independent of State intervention. But often, especially when negotiations fail, the State fixes the price as a last resort. So even though the State does not directly decide agricultural prices, it retains several ways of influencing them.

The prices that growers get for their produce constitutes the determining factor of their income, and impacts the way they view different possible crops (in terms of cultivated area and the intensification of applied techniques). The low price paid to seed cotton producers in Ghana has often been mentioned as the source of their disinterest in cotton as a crop, in contrast to their neighbours in the CFA zone. It is thus necessary to see how this price has changed over time, in comparison to food crop prices and to those obtainable in neighbouring countries.

<u>Problems due to lack of knowledge of prices paid to producers</u>

While the seed cotton price is fixed annually at the national level, the food crop prices are not. These vary widely from one market to another in the same country and within the same year. To be able to make comparisons over the years and for different countries, we have to arrive at a mean price for each crop. Unlike for seed cotton, this price will however obviously not be representative of all the transactions that took

place in the year for all the producers. In addition, prices paid to producers differ from those charged from consumers; they can vary up to a factor of two for retail and wholesale (Brüntrup, 1997). Price data is often presented in papers and reports without a clear mention of how the prices cited were arrived at, thus rendering them difficult to use. It was not possible for us during the mission to obtain directly the prices of the main food crops over the past few seasons. Data from FAO[5] of the prices paid to producers has been used here.

Prices paid for seed cotton to the producers may seem at first easier to acquire. However, generally there exist two or three purchase prices based on the quality of the seed cotton being purchased. Some seed cotton price data was obtained by the equalization of seed cotton prices depending on the tonnages purchased of the different categories (Goreux and Macrae, 2003), which can explain some price differences between different sources. To conduct a meaningful comparison between countries, we will refer here to the purchase price of the first choice seed cotton since most cotton purchased is of this quality and corresponds to quality obtained by normal cultivation practices. A second difficulty arises from the fact that in certain countries, such as Benin and Burkina Faso, the initial price of the seed cotton can be increased at the end of the season by a premium depending on the financial performance of the system subsector. We will take into account this possible price premium, which not all sources do. Finally, the cotton prices in Benin in the last few years have been somewhat unusual, with several price announcements during the season, often late, depending on the cotton fibre prices obtained by the ginners.

Knowing the prices of inputs is also difficult because cotton growers generally obtain their inputs from the mills at prices different from retail prices elsewhere. Depending on the source, the price of inputs includes, without sometimes indicating it, the cost of seasonal credit extended, often representing 10% or more of the price. Data here includes this cost.

Comparisons of prices between countries require the use of mean exchange rates between different national currencies, which can skew calculations, especially in cases of major currency fluctuations.

[5] FAOSTAT database available on the Internet at http://faostat.fao.org/site/570/default.aspx

Comparison of changes in producer prices for seed cotton in Ghana and neighbouring countries

Changes in the seed cotton purchase price in Ghana, Burkina Faso and Benin from 1984 to 2006 are shown in Figure 2. The purchase price in Burkina Faso and Benin track each other for the most part, with the price in Benin being slightly higher – which makes sense since it is a coastal country and with lower transport costs, cotton mills can pay its growers a little more.

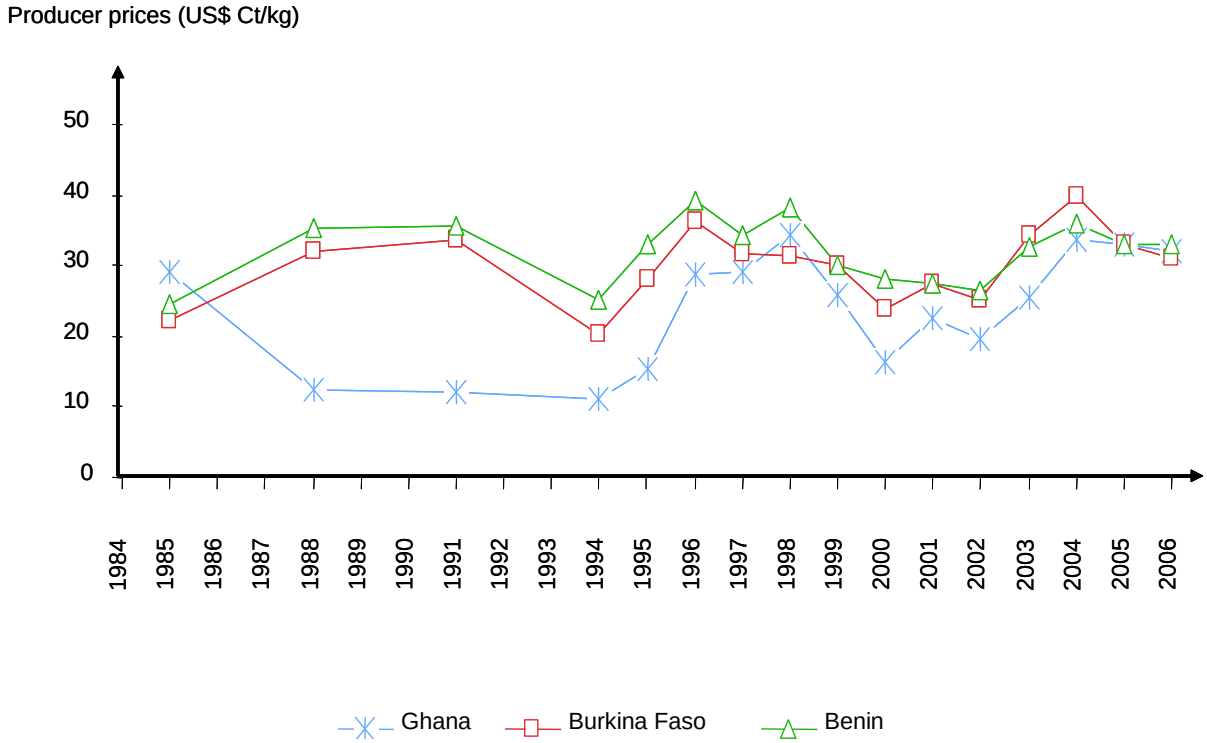


Figure 2: Comparison of changes in producer prices for first choice seed cotton.

In contrast, the seed cotton purchase price in Ghana was lower than those in Benin or Burkina Faso from 1999 to 2003 and very much lower during the 1988–1995 period. It was only in 1998 and during the last two seasons that the purchase prices in all three countries were more or less the same. The comparison during the 1988–1995 period is skewed because inputs were subsidized in Ghana and the seed cotton purchase price took that into account. On the other hand, the comparison for 1998–2005 makes sense, the cost of inputs being more or less the same in all three countries. It should be noted that the closing together of the seed cotton prices in the last two seasons in these countries is due to a drop in producer prices in the countries of the CFA zone and an increase in Ghana. The drop in prices in the countries of the CFA zone is due to a marked fall in world prices for cotton fibre; industries cannot pay growers the same prices as earlier without endangering the entire cotton production system. This fall has taken place in a context where the power of producers in negotiating prices is considerable. The cotton industry in Ghana is also confronted with the same problems regarding the fall in prices of cotton fibre, and we cannot foresee the prices paid to producers, similar to those in the neighbouring countries, increasing without a substantial increase in cotton fibre prices without endangering the entire cotton producing industry.

As evidence, 3 shows the change in the proportion of the seed cotton purchase price as a percentage of the cotton fibre sale price. This ratio shows the contribution of the grower in the cotton industry's finished product.

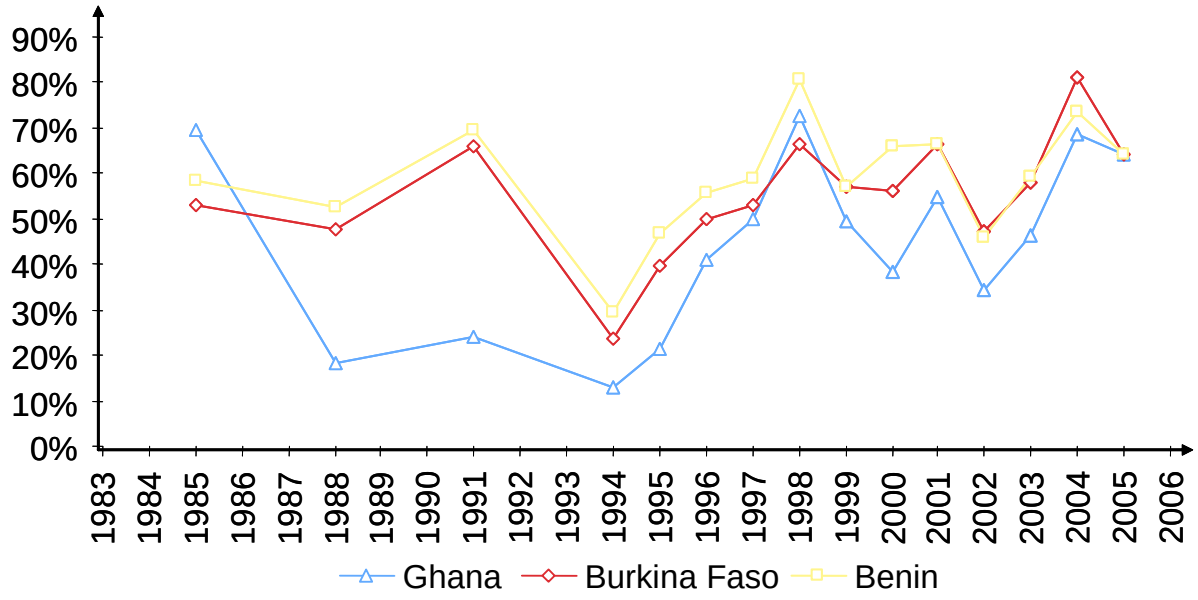
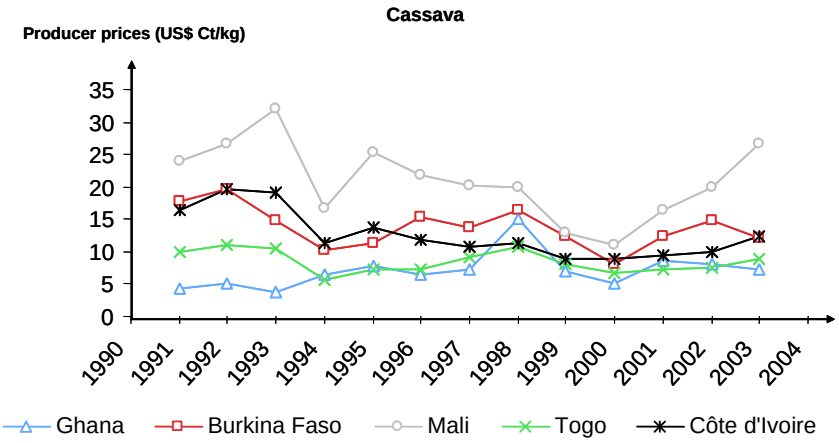
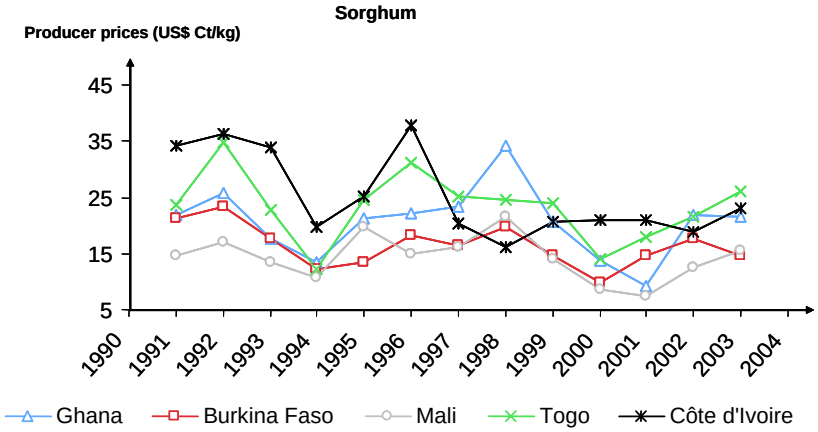
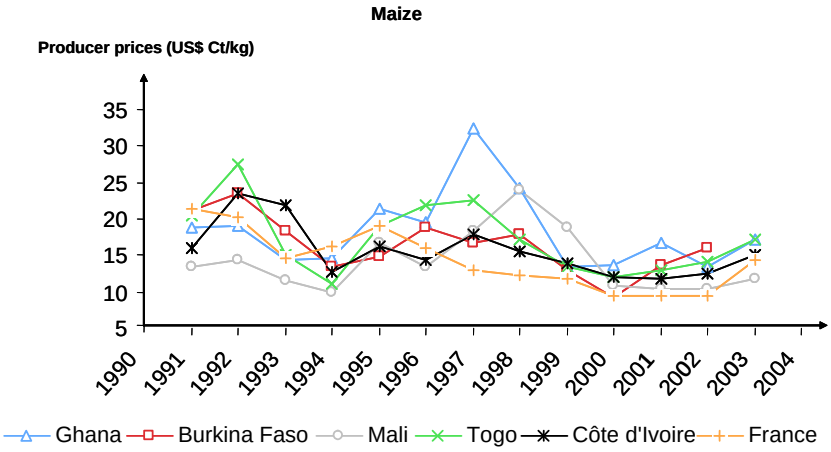


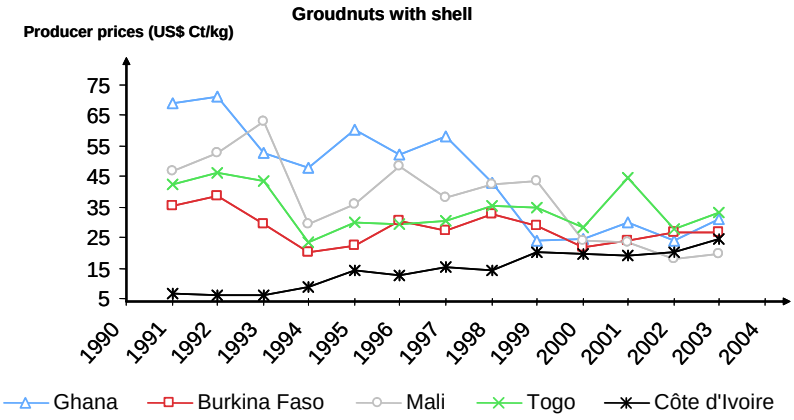
Figure 3: Changes compared in the ratio seed cotton purchase price/cotton fibre sale price (on the basis of a ginning yield of 40%).

The 2004 levels, with between 70% and 80% of the sale price of the cotton fibre going to the seed cotton grower is unsustainable over the long term and, if maintained, would endanger the entire cotton production system. Unless the cotton fibre prices rise, it is difficult to envisage an increase in the purchase price of seed cotton. In 2005, the ratios for the three countries were very similar. The Ghanaian ginning and cotton fibre industries are not more efficient than their counterparts in Benin or Burkina Faso and we can conclude that the seed cotton growers in Ghana were paid a price equivalent to that paid in the CFA zone. This was not the case earlier, notably in the 1998–2003 period (before 1995, the same remark applies, since the low ratio in 3 for Ghana does not take into account input subsidies).


Cassava
Producer prices (US$ Ct/kg)
35
30
25
20
15
10
5
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
Ghana
Burkina Faso
Mali
Togo
Côte d'Ivoire


Sorghum
Producer prices (US$ Ct/kg)
45
35
25
15
5
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
Ghana
Burkina Faso
Mali
Togo
Côte d'Ivoire


Maize
Producer prices (US$ Ct/kg)
35
30
25
20
15
10
5
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
Ghana
Burkina Faso
Mali
Togo
Côte d'Ivoire
France


Groudnuts with shell
Producer prices (US$ Ct/kg)
75
65
55
45
35
25
15
5
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
Ghana
Burkina Faso
Mali
Togo
Côte d'Ivoire

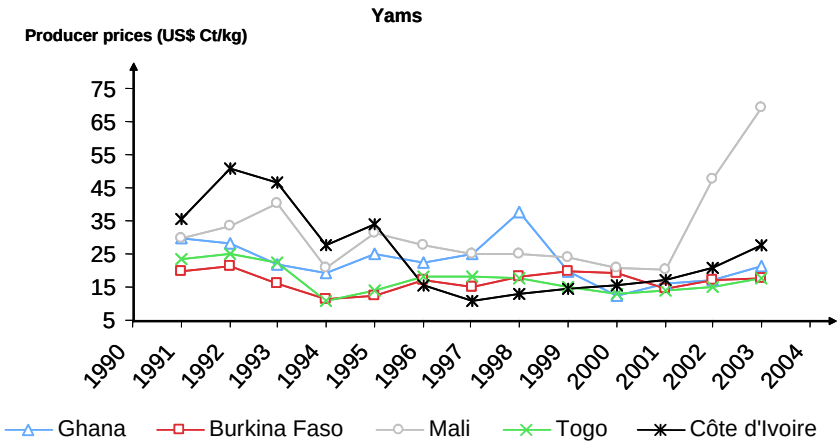


Figure 4: Changes in prices paid to growers of the main food crops (FAOSTAT data)

Comparison of changes in producer prices for food crops in Ghana and neighbouring countries

The only data we have is from the FAOSTAT database, which may contain some inaccuracies. Moreover, the mean annual price in a country for a food crop is not as representative as it is for seed cotton because the purchase price for food crops can vary substantially in the same country from one market to the next and in the same year. Whereas the cotton markets are generally organized within producing villages or in nearby ones, this is not so for food crops. And the proximity of the market where the grower will be able to sell his produce constitutes yet another factor for price differentiation.

Figure 4 shows the change in purchase prices paid to producers of the main food crops from 1991 to 2003. We can see that apart for cassava, the prices paid to growers in Ghana are generally higher than those in neighbouring countries, or at worst are more or less the same. Also, it can be seen that on the whole, towards the end of the period, the different curves approach each other, indicating the closing together of food crop prices in the countries of the sub-region. We can see here the effect of the reduction of State intervention in the fixing of prices which tend now to be regulated by the marketplace. These prices will be used in the following sections of this report.

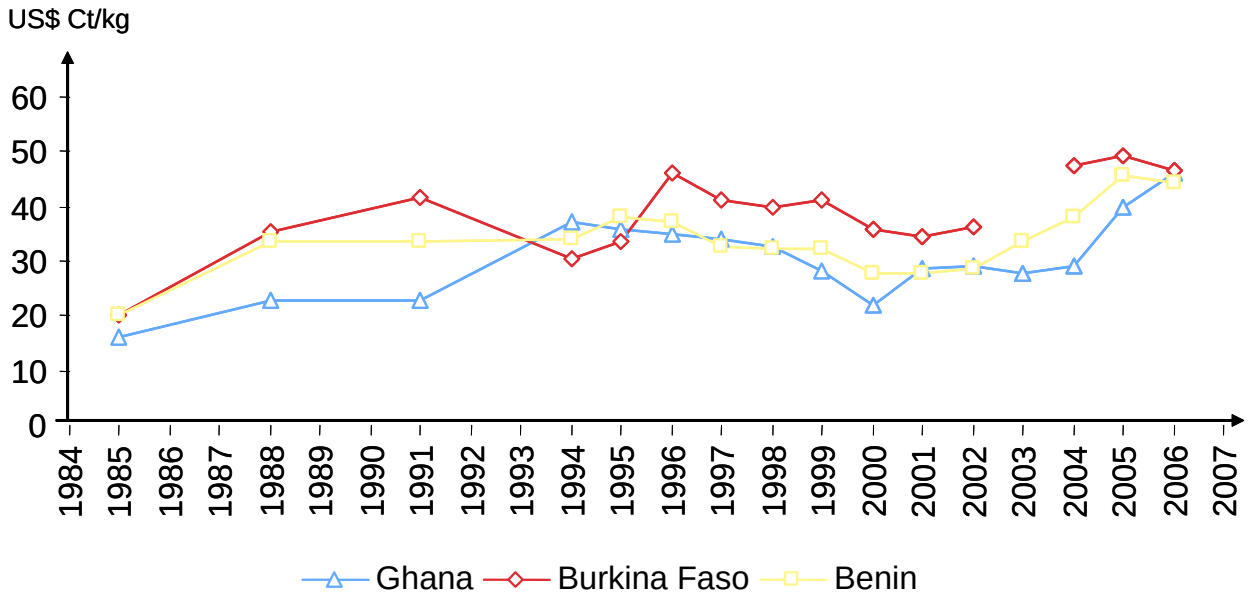
Comparison of changes in the sale price of agricultural inputs

This is shown in Figure 5. Compound fertilizer in Ghana differs from that in other countries: in Ghana, it follows the 15-15-15 formula, whereas in the other countries the formula additionally includes sulphur and boron. Nevertheless, we can see that the three curves have tended to go up over the period. Prices in Benin are generally lower than those in Burkina Faso, which is logical if we consider the different transportation costs. The price of NPK fertilizer in Ghana has, on the whole, been lower than in the other countries but the curves have tended to approach each other, with more or less equivalent prices in 2006.

It is also possible to compare the changes in the total cost of recommended inputs per hectare of cotton cultivation (Figure 6). The recommendations differ in the three countries: type of compound fertilizer, type of additional nitrogen input (ammonium sulphate in Ghana, urea in the two other countries), treatment programmes and insecticide products. To not skew too much the data, we have not taken into account

the cost of tilling in the total for Ghana since this expenditure is not applicable to the other two countries.

Figure 5: Comparison of the changes in the price of compound fertilizer in Ghana and neighbouring countries.



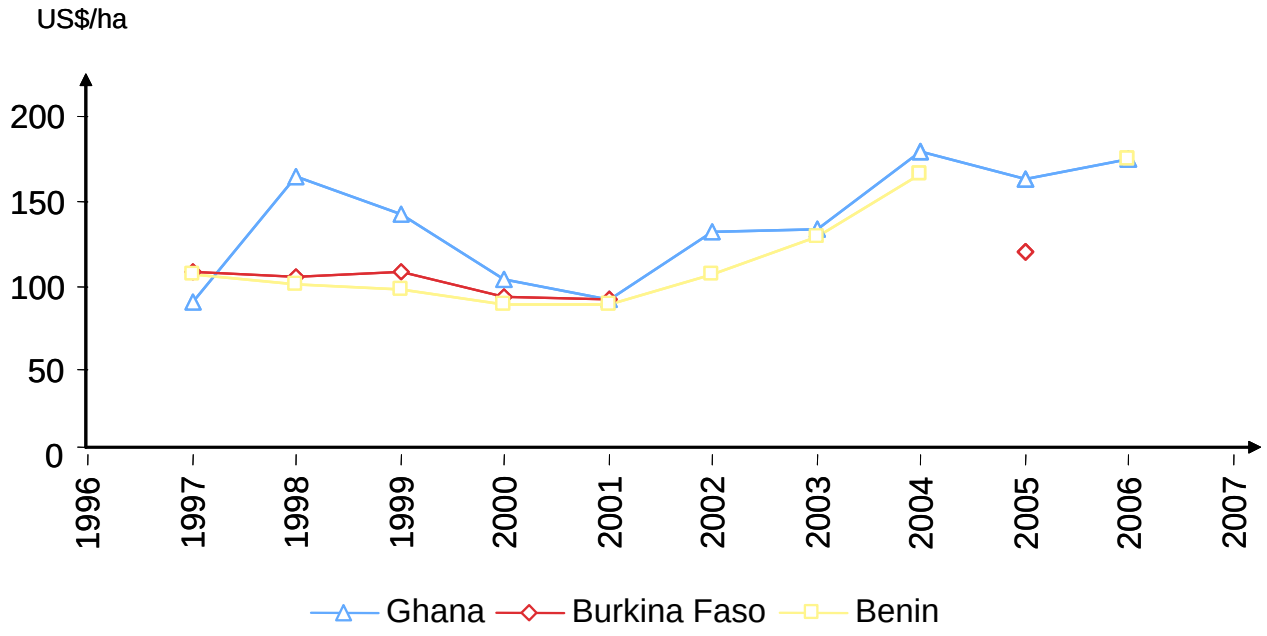


Figure 6: Comparison of total inputs costs.

The total input costs per hectare are comparable in Benin and Ghana for the last six years.

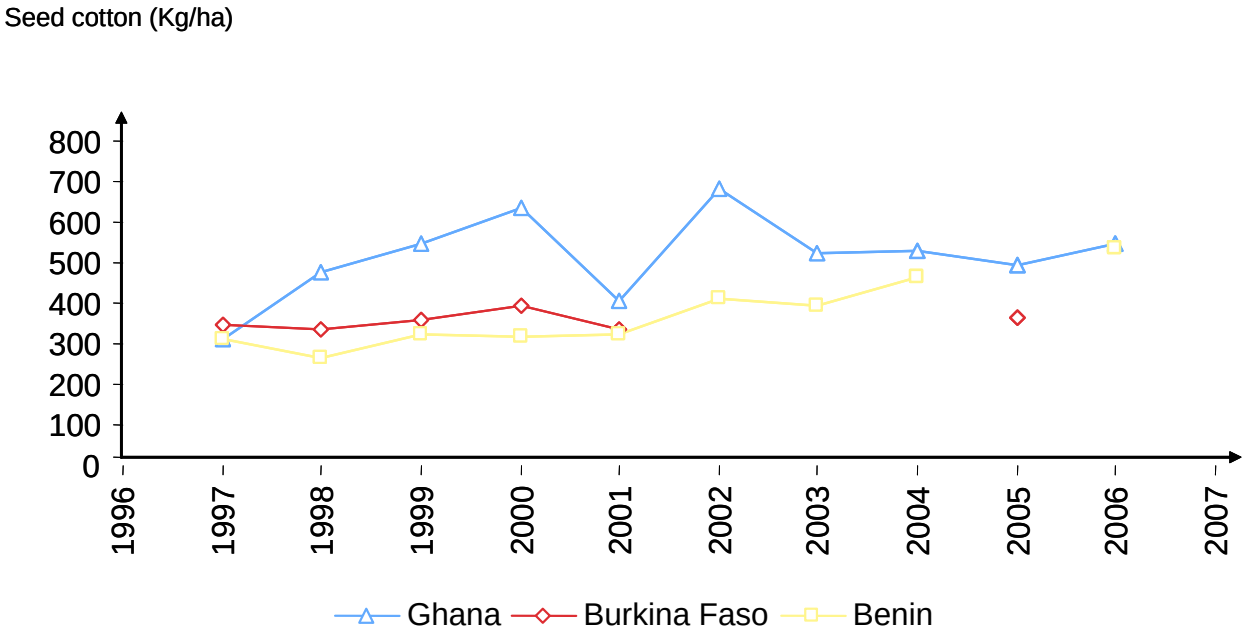


Figure 7: Comparison of the seed cotton quantity necessary to pay for the inputs.

Figure 7 shows the changes over the years in the quantity of seed cotton necessary per hectare to pay for the cost of the inputs. This quantity was higher in the past for Ghana, but has become comparable to that for Benin in 2006. In 2006, a grower in Ghana must produce 550 kg/ha to cover the input costs, without including the cost of tractor tilling, and 670 kg/ha when including it. In these conditions, only good yields obtained by intensive farming techniques will lead to profits from this crop.

Impact of the seed cotton purchase price

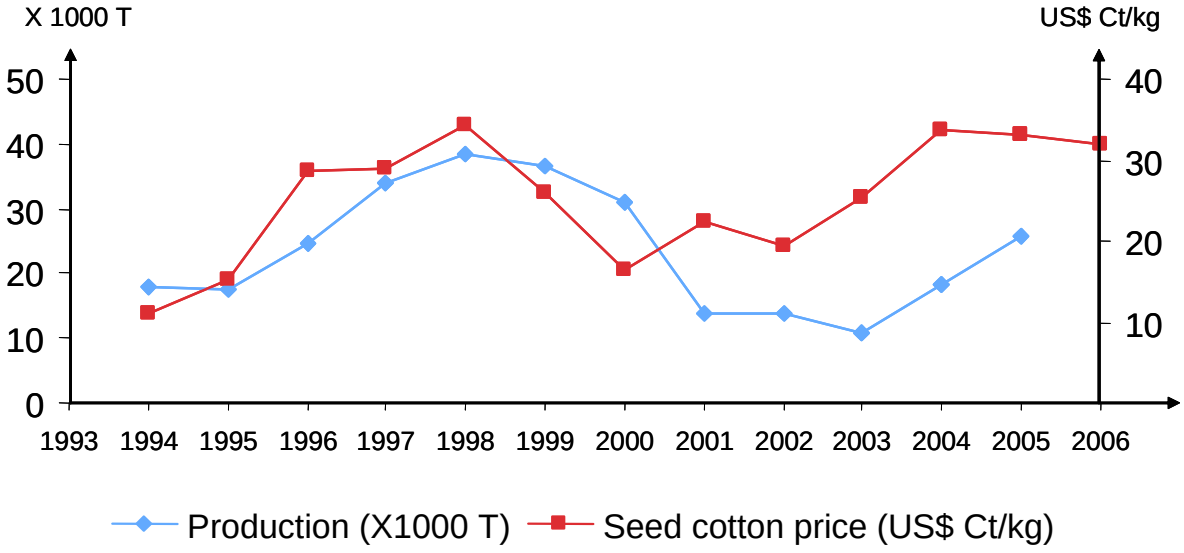


Figure 8: Changes in seed cotton production and seed cotton producer prices in Ghana.

Figure 8 shows the correlation between the purchase price paid to seed cotton growers and the national cotton production. The latter curve is somewhat offset from the first; this represents the reaction time between the seed cotton purchase price and the production.

Conclusions

Economic conditions for cotton production have long been less favourable in Ghana than in neighbouring countries. Very recently, however, these conditions have become comparable due to an improvement in Ghana and a worsening in the neighbouring countries. As far as food crops are concerned, the economic conditions are either the same or better in Ghana than in neighbouring countries. In this context, it is not surprising that Ghanaian national cotton production depends on the seed cotton price fixed for purchases from growers. Nevertheless, the price reached in 2006 cannot increase without endangering the entire cotton production system unless there is a sustained and significant increase in the price of cotton fibre. The fall in seed cotton purchase prices in neighbouring countries in the last few seasons occurred in spite of the growers' clout during price negotiations, and confirms the observation that no increases are likely with cotton fibre prices prevailing at 2006 levels.

Nor is the seed cotton purchase price the only factor in the growers' reluctance to plant cotton. During our meetings with farmers and groups of growers, delayed payment for the seed cotton (up to eight months in some cases) was almost always cited as a cause for their lack of interest in cotton cultivation.

Recommendations

1.) Avoid any excessive change in the seed cotton purchase price. This can be done by absorbing over several years the rises and falls caused by changes in exchange rates or by changes in the prices of cotton fibre and inputs. Frequent changes inject an element of economic uncertainty and tend to scare away new farmers from the cotton crop.
2.) Pay growers on time. Late payments tend to negate any positive effects that a favourable price climate may create for the growers.

3.6.4.2 Comparison of the productivities of different crops

The prices of agricultural produce allow us to calculate the profitabilities of different crops that exist in the region and to compare them. Towards this end, the 2001 and 2006 seasons were selected for Ghana and Burkina Faso, with each season consisting of two crop cycles, the first traditional, the second intensive. The calculations are detailed in the appendices. The labour component was drawn from several references, in particular Brüntrup (1997), Crétenet (1983) and Faure (1990), whose data was extracted from farm monitoring programmes. The yields of the different crops for the two crop cycles were obtained from a French Cooperation Ministry report (1987).

Tables showing the different calculations and explaining their basis are included in the appendices. Using them, it is possible to estimate and compare the land and the labour productivities of the different crops (see Figure 10 and Figure 9). The land productivity is defined as the earned income per hectare by the sale of the produce less the cost of agricultural inputs. In Ghana, the cost of motorized tilling of the soils has been included in the input cost (except for tuber crops) since this practice is widespread there. In Burkina Faso, the calculations included the cost of draught-animal tilling of the soil. Labour productivity is the preceding result divided by the quantity of man-days necessary for the entire growing cycle. In the context of land-supply pressures where the amount of land is the limiting factor for production, it is the land productivity that has to be maximised. In an environment where labour is the limiting factor, labour productivity has to be increased. It this latter factor that predominates in Ghana as well as in Burkina Faso.

The land productivity is high for tubers, especially in intensive farming. Yields of more than 8 T/ha are common. But, generally, farms only devote small plots for tubers since labour requirements are high for these crops. Amongst non-tuber crops, land productivity is the maximum for cotton or groundnuts, followed by maize and sorghum, in that order. This conforms with others' findings (Guibert *et al*., 2002). This was not however the case in Ghana in 2001, irrespective of the cropping technique, because of the low remuneration received by cotton growers. It only became so for Ghana in 2006 with intensive farming.

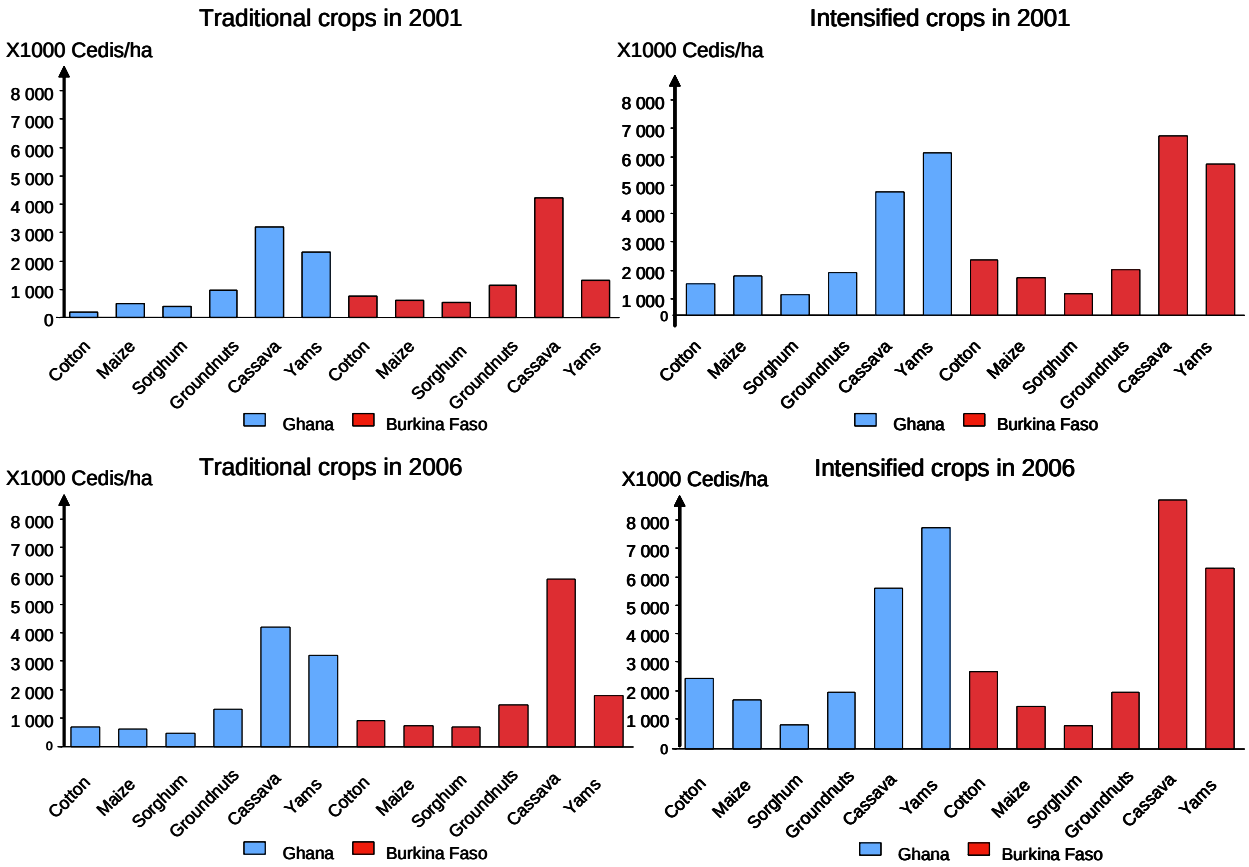


Figure 10: Comparison of land productivities for different crops.

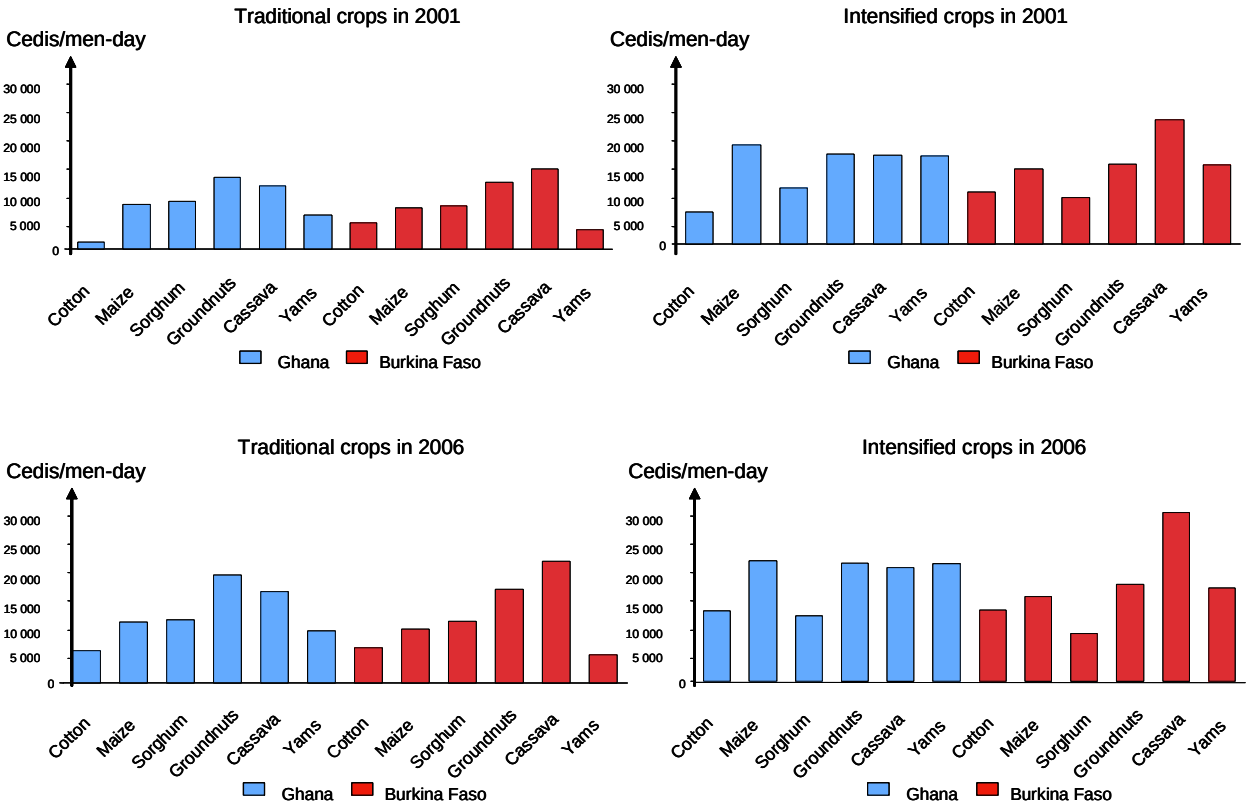


Figure 9: Comparisons of labour productivities for different crops.

As far as labour productivity is concerned, tuber crops have productivities similar to those of other crops because of the substantial amount of labour required for crop management. The labour productivity for the cotton crop is, in most cases, the lowest

amongst all the crops considered here; the differences with food crops were large in Ghana in 2001 but less so for intensive cotton farming as compared to cereal crops. In 2006, in both countries, only one intensive cotton crop shows a labour productivity that isn't much lower than of the food crops.

These results suggest that the growers who plant cotton do not do so because of its labour productivity, since it does have the best labour productivity. The seed cotton price fixed in advance, the possibility of obtaining seasonal credit, one-time payment for the harvest and the organisation of cotton markets near growing areas are also inducing factors.

But, however, if the cotton crop's productivity becomes too low as compared to food crops, there will be a drop in the number of farmers who will grow cotton. This was the case in Ghana in 2001 and is becoming so in 2006 for traditional cultivation.

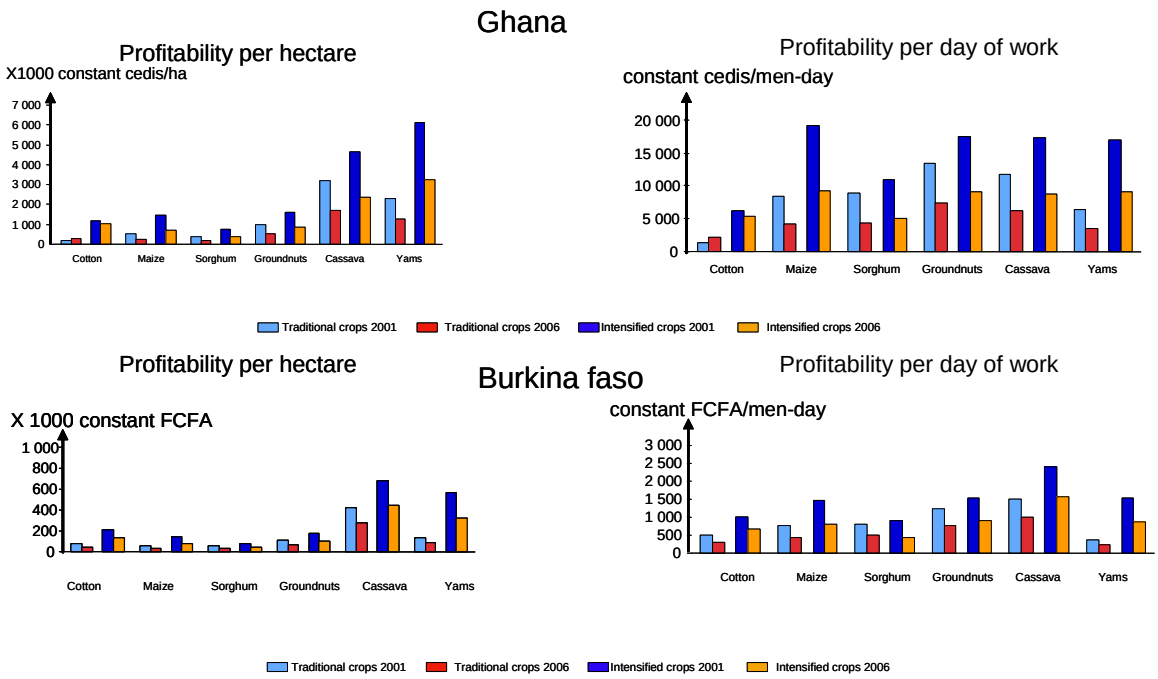


Figure 11: Compared productivities for 2001 and 2006 in constant local currencies for the main

To compare changes in crop productivities between 2001 and 2006, we must work in constant local currencies, as shown in Figure 11. We can observe a significant lowering of productivity for almost all crops, except cotton in Ghana. Food crops in Ghana lost a lot of their productivities in constant cedis between 2001 and 2006 because of the high inflation rate in the country.

Conclusions

Productivities, and thus the incomes in constant cedis and FCFA, have currently decreased substantially for Ghanaian and Burkinabe growers. Only the productivity of cotton cultivation increased in Ghana between 2001 and 2006. Intensive farming remains the only way of increasing agricultural incomes. Cotton cultivation has been the driving force of this intensification in the countries of the CFA zone. Developing this crop and intensifying farming for the other crops is a means of increasing incomes of farmers in northern Ghana.

3.6.4.3 Comparison of cultivation systems

During field visits, 8 farms were surveyed for cultivated areas and sales performance. This data can be compared to surveys conducted in Burkina Faso and Benin (see Table 1). During the mission, we could not find data from any recent or broader surveys of cultivation systems in northern Ghana.

The farms are of similar sizes: 11 or 12 residents per farm. Panin (1988) arrives at similar results for surveys conducted in 1982/83 in the Northern Region: 10.8 residents for manual farming and 14.5 for draught-animal farming. The total area under cultivation per resident is a little lower in Ghana (41 ares) than it is in the other two countries (over 50 ares). Panin (op. cit) finds 35 and 44 ares respectively of cultivated area per resident for manual and draught-animal farming. Tractor tilling, common in Ghana, does not allow an increase in this cultivated area. Draught-animal farming is not widespread in Ghana.

The acreage under cotton is lower in Ghana. The yields and income are lower in Ghana, but one must note that 2005 was a bad year in Ghana and 2004 a good one in Benin. We were told that some farms in Ghana had a cotton income that was two or three times greater in 2004 than in 2005.

Data acquired in Ghana is too skewed to be used for reliable conclusions. We can nevertheless posit that the size of the Ghanaian farms and those of neighbouring countries are similar, both in the number of residents and in the cultivated area. Differences in economic results will be mainly due to the cultivation system, the yields obtained and the price of agricultural produce. Such data, if it had been acquired over representative samples, would allow for real comparisons, closer to reality than the economic calculations of the previous section.

3.6.4.4 Conclusions

The development of cotton cultivation as a means of intensifying cultivation systems in Ghana is a possible way of reducing poverty there, despite the unfavourable economic context of low cotton fibre prices. Economic conditions for the satisfactory development of this crop are now applied to Ghana, in a context where the income of African growers is on the low side. There is very little leeway for increasing prices paid to growers and we will have to rely on promoting techniques for increasing and sustaining yields and farming income.

Table 1: Comparison of cultivation systems in Ghana and neighbouring countries.

	Ghana (year 2006)	Benin (year 2004)	Eastern provinces of Burkina Faso (year 2004)
Total number of samples (number of farms surveyed)	8	78	26
Number of residents surveyed	**94**	**850**	**303**
Number of residents/farm	12	11	12
Total cultivated area (ha)	39	442	173
Cotton area (ha)	10,5	198	52
Total area/resident (ares)	41	52	57
Proportion of cotton (%)	27	45	30
Cotton area/resident (ares)	11	23	17
Mean cotton yield (kg/ha)	1112	1383	
Mean food crop yield (kg/ha)	792	1209	
Net income*/resident (1000X cedis**)	245	403	

* excluding self-consumption
** base 1000 FCFA = 17900 cedis

3.7 Ginning, production and marketing of lint, quality issues

3.7.1 Overview

In GHANA there are 4 Cotton Companies which have 6 ginning factories in the north of the country and which are currently in a fit state to operate:

- GHANA COTTON COMPANY Ltd (GCCL), which runs three factories in TAMALE, TUMU and BOLGATANGA; these 3 factories are equipped with LUMMUS machinery from the United States (we did not visit the TUMU factory which is situated in the North West of GHANA close to the border with BURKINA FASO),
- NULUX PLANTATIONS Ltd, which runs a factory in TAMALE, equipped with facilities from the Popular Republic of China,
- PLANTATIONS DEVELOPMENT Ltd (PDL), which runs a factory in WA for which the equipment also comes from China,

- INTERCONTINENTAL FARMS Ltd (INCOF) which operates a factory in TAMALE, also equipped with machinery from China; during our visit, this factory was in the process of being dismantled and transferred to the centre of TAMALE to an industrial zone within the same town.

As the purpose of our examination is not to carry out a detailed technical analysis[6], we will examine hereafter, very briefly, the tools of the trade owned by these four Companies. This review essentially covers machinery, ginning capacity and technical results in order to assess their potential in terms of fibre production.

It should also be noted that a satisfactory status report was drawn up concerning access to and the state of the buildings for the four factories visited: 2 in TAMALE (GCCL and NULUX), 1 in BOLGATANGA (GCCL) and 1 in WA (PDL).

Power supply for the six factories comes from the National Network, and all the factories, except for TUMU, are situated close to asphalt roads and easy to access.

3.7.2 Ginning equipment & machinery

We can classify the ginning factory machinery into two groups, on the basis of the equipment manufacturer:

- The GCCL machinery, **based on LUMMUS (USA) equipment**, modernised or recent, and which gin 75 to 80 % of national production; this machinery is present:

  - in the BOLGATANGA factory, equipped in 1998, which is the best equipped of all the country's factories and at the same level as the factories operating in neighbouring countries; in particular it has two modern IMPERIAL III saw gins with 170 saws and Model 700 feeder as well as a LIFT-BOX DOR-LES down packing press; 20x54 universal density and which can operate at the rate 25 220 kg bales per hour at universal density. We noted that the bales produced could exceed this figure (240/245 kg). Before pressing, there is a moisture conditioning (MC) condenser that can raise, if necessary, the lint humidity, which must nonetheless remain within accepted levels,

  - at the TAMALE and TUMU factories, equipped in 1979 with 2 IMPERIAL II saw gins with 128 saws each, transformed to 158 saws in 2001; the equipment is less sophisticated than at BOLGATANGA. A new 20x54 down packing press, with a capacity of 25 bales of 220 kg per hour, again at universal density, was introduced at TAMALE in 2003. As for the TUMU factory, it has an up-packing 20x41 universal density press, with a capacity of 20/25 bales per hour, currently reduced to around 10 bales/hour for maintenance reasons,

- The machinery at NULUX (TAMALE), PDL (WA) and INCOF (TAMALE), **based on machinery imported from China**, is much less sophisticated than the GCCL machinery and gins 20 to 25 % of national production; the TAMALE and WA factories (equipped in 1993 and modernised in 1997) are equipped with 2 groups of 2 gins with 91 saws and with presses for 220 kg bales which apparently has a capacity of 10 bales/hour. The INCOF factory (equipped in 2000) only has one unit with two 91-saw gins and operates one press for 80 kg bales with a capacity of roughly 13 bales/hour, the lint produced being essentially destined for the local market.

[6] The study of the industrial machinery was not included in the terms of reference for the assessment

Moreover, all the factories have lint cleaning systems (air-type, saw-type and brush lint cleaners), the essence of which lies in a compromise between improving the grade and respecting the fibres in terms of length and tenacity.

The machinery used is therefore relatively recent but there are still needs in terms of maintenance that will increase as the equipment begins to age (spare parts, personnel, etc.). This is reflected at the BOLGATANGA factory, the largest in the country, which has experienced maintenance problems since 2003, although this year, a team from LUMMUS has taken charge of the revision of the three GCCL factories.
In the same way, NULUX, during the campaign, called in 2 Chinese technicians.

Lastly, it should be noted that the NULUX factory in TAMALE has a delinting unit; the same applies for PDL in WA (mechanical delinting as the chemical delinting unit was shut down several years ago).

3.7.3 Ginning capacity

We will define the potential daily capacity of the factories under normal operating conditions or possible normal daily capacity (Cd); normal operating conditions mean that all the machines in the production line are operating normally with a regular and uniform seed cotton feed, without bottlenecking.

The formula giving daily capacity, **established on the basis of the work of the ginning units which constitute the heart of the system**, is as follows:

$$Cd = N\ S\ H/1000\ F$$

Where: Cd represents the desired capacity, in tonnes of seed cotton/day,
N, the total number of gin saws,
S, the average ginning speed in kg of lint, per saw and per hour,
H, the actual number of factory operating hours per day
F, the lint yield per unit.

Where H = 19 hours, that is to say an efficiency of 79 % (a capacity three shifts, 5 hours per day stoppage on average for breakdown, closedown, various stoppages, maintenance and cleaning) and F = 0.40 (40 %), the formula becomes:

$$\mathbf{Cd = 0.0475\ N\ S}$$

As for ginning speeds (S), in general these are speeds recommended by the manufacturers in order to safeguard the quality of the fibre and which should be respected. These are real, obtainable speeds which take into account the design of the gins as well as their feeders, maintenance, adjustments, their environment (no bottlenecking), and the variety and quality of the cotton seed (humidity and impurities).

We have selected the following figures:

- for the three factories with LUMMUS machinery:

We will apply the average figures for the identical Lummus gins operating in the Sub Region, that is to say:

- Bolgatanga : 14 kg/saw/h
- Tamale and Tumu : 10 kg/saw/h (< to the "actual" 158 saws)

- for the three factories with equipment from China

As we were not provided with any actual figures, we have opted for 6.5 kg/saw/hour (between 6 and 7), on the basis of certain comparable LUMMUS or CONTINENTAL machines used in the Sub Region, **but of a much earlier design**.

The following table recapitulates the normal, average, possible daily capacities for each factory.

Normal average potential of the factories (in tonnes of seed cotton/day)

Companies	Factories	Number of saws	Ginning speed (kg/saw/h)	Daily capacity
GCCL	BOLGATANGA	2 x 170	14	226
	TAMALE	2 x 158	10	150
	TUMU	2 x 158	10	150
	Total GCCL			**526**
NULUX	TAMALE	4 x 91	6.5	**112**
PDL	WA	4 x 91	6.5	**112**
INCOF	TAMALE	2 x 91	6.5	**56**
TOTAL				**806**

NB 1: the NULUX and PDL factories have presses with a capacity of 10 bales/h, i.e. a production of 0.220x10x19 = 41.8 tonnes of lint/day, to be compared with the production from gins which is 44.8 tonnes of lint/day; the presses here constitute a bottleneck,

NB 2: the capacity of the TUMU factory is temporarily limited to 100/110 tonnes of seed cotton/day because of the press,

NB 3: with its 3 factories, the GCCL has a ginning capacity of 526 tonnes of seed cotton per day, that is to say nearly 2/3 (65%) of the total capacity available in GHANA and the cotton production zone in TAMALE (3 factories), a ginning capacity of 280 tonnes of seed cotton per day,

NB 4: over 150 working days as is the case in neighbouring countries, working four shifts and 7 days/7 with an efficiency of 79 %, the capacity of the GHANA factories can be estimated at 120,000 tonnes of seed cotton per year, at the minimum 100,000 tonnes if we make a concession at the level of the efficiency rate (maintenance problems) and/or number of working days.

3.7.4 Technical results

The following table represents the trend in ginning results during the last 6 years:

Trend in ginning results

	Companies	2000/2001	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006
Production of seed cotton (tons)	GCCL	18 869	8 410	8 784	7 295	12 738	20 627
	PDL	2 394	2 109	1 189	719	1 934	1 992
	NULUX	4 218	1 348	1 848	1 592	1 981	2 209
	Other	5 535	2 112	1 806	1 228	1 659	851
	Total	**31 016**	**13 979**	**13 627**	**10 834**	**18 312**	**25 979**
Production of cotton lint (tons)	GCCL	7 176	3 305	3 432	2 962	5 102	8 202
	PDL	1 005	1 223	408	287	774	772
	NULUX	1 627	497	742	618	811	911
	Other	2 214	845	722	491	664	340
	Total	**12 022**	**5 870**	**5 304**	**4 358**	**7 351**	**10 225**
Gross lint yield	GCCL	38.03%	39.30%	39.07%	40.60%	40.05%	39.76%
	PDL	41.98%	**57.99%**	34.31%	39.92%	40.02%	38.76%
	NULUX	38.57%	36.87%	40.15%	38.82%	40.94%	41.24%
	Other	40.00%	40.01%	39.98%	39.98%	40.02%	39.95%
	Averages	**38.76%**	**41.99%**	**38.92%**	**40.23%**	**40.14%**	**39.36%**

We have the following remarks to make concerning this table, as the PDL figures for the 2001/2002 campaign were incorrect:

1 – as regards the capacities established above, the GHANA factories are very clearly oversized for current cotton seed production, with running speeds that are probably very chaotic, depending on cotton seed supply and breakdowns,
2 – the GCCL alone handles 75 to 80 % of the country's fibre production, the other Companies' production being low and more in the field of craftmanship than industrial production,
3 – average fibre yields are about 40 %, which is around 2% down on rates achieved in the neighbouring countries but similar to that of CHAD.

We do not have precise numbers for quantities of seeds produced, the proportion of which amounts, on the basis of the whole cotton flower, to 52 % for NULUX (high proportion of waste), to 53/ 54 % for the GCCL factories and 56 % for PDL (average waste).

3.7.5 Seed cotton quality

The quality of seed-cotton depends on several factors: date of harvesting, duration between harvesting time and picking time, quality of spraying, quality of picking, grading at farm level etc.
The way some farmers harvest their cotton leads to poor quality, and in order to improve the situation, Cotton companies and farmers have agreed on the principle of

two grades for seed-cotton and two consequently two prices, price for grade B being 20% lower than price for grade A.

Cotton companies have prepared samples ("boxes") displaying samples of seed-cotton with grade A and B. Unfortunately, the device used by GCCL cannot be used efficiently, leading to a grade A proportion of seed-cotton higher than 98%, far above the real situation. At the same time, a better-designed sample box enables Nulux to do a proper grading with about 30% of grade B seed-cotton.
Since GCCL produces about 80% of the cotton of Ghana, it means that most of the seed-cotton of Ghana is purchased without grading, which explain some of the lint quality problems. Annex 5 shows the two seed-grading boxes.

To agree on a standardised grading system, using the same samples and principles is an absolute necessity to improve the quality of seed-cotton.

3.7.6 The quality of the lint

As mentioned above, the quality of the lint, which is essentially a question of the variety of cotton seed, also depends on the fertilising and health related measures taken, the optimisation of the harvest, the storage and transport conditions for the cotton seed and of course, the ginning conditions. Of course, it is also important that the packaging, the handling and storage of the bales is carried out with due care and in this respect it should be noted that the three GCCL factories are equipped with bale handling and bagging systems with pushers, the polypropylene bags being supplied by FILTISAC (RCI). The bale handling systems are traditional systems, the "clamp" type mechanisms being preferable.

All companies have their own way for classing the lint they produce:

- GCCL has set-up a classing facility in Bolgatanga; the classing system is based on 9 categories, the three first ones being the "grade A".

- Nulux has invested in classing equipment to measure the main characteristics of each bale.

- PDL is sending its samples to Burkina Faso (SOFITEX).

- INCOF: no classing (only local sales).

Several samples of lint taken at the GCCL Bolgatanga facilities have been tested by the CIRAD laboratory in Montpellier; the results are detailed in Annex 6 and can be considered as quite satisfactory, as the conclusion of the analysis says for the two samples"[7]:

- *" These cottons are long around 1"1/8 and a little more but under 1"5/32 with a good uniformity and small quantity of short lint. The strength is good as well as the elongation ".*
- *" The colour shows a good reflectance and close to white classified in Middling white in the USDA table; one can look at some visible small trash inside the lint "*

3.7.7 Marketing of lint

For many years, the cotton produced in Ghana has been sold to the local industry; most of the industry has however disappeared during the last years, mainly because

[7] This is only the result of the analysis of the samples and should of course not be extrapolated at all the Ghanaian cotton production!

of the competition of cheaper products from the Far East, especially China. From about 20 000 T of lint sold locally in the early 90s, the local consumption is now about 4 000 T, with only one company, Akosombo Textiles Ltd buying local lint.

Most of the lint is therefore sold on the world market, through traders and brokers, who usually trade lint from neighbouring countries.

Because of quality problems, it seems that Ghana lint is usually discounted by 5 to 10% to the Cotlook Index prices. This is due to several aspects:

- Lint quality could be improved,

- Ghana cotton is not known on the market because of the too small quantities traded,

- Ghana production is inconsistent, varying a lot from year to year; it is therefore very difficult for a trader to create loyalty among users of cotton from Ghana,

- The various quality problems mentioned above.

3.7.8 Conclusion

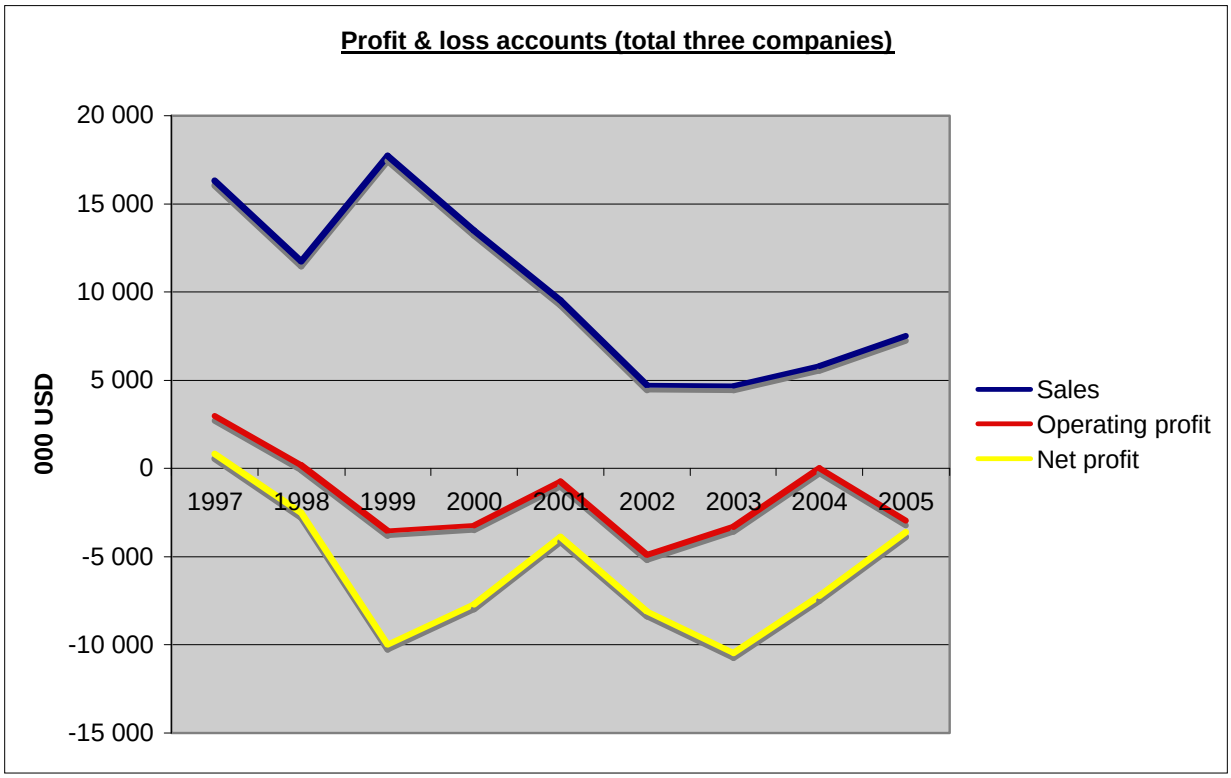
The 4 Cotton Companies operating in GHANA have relatively recent factories equipped either with modern, high quality LUMMUS machinery, in particular in BOLGATANGA, which can be highly productive, or with facilities imported from China; these factories are currently clearly underused.
The conclusion of the assessment of ginneries is that there is no need for heavy investment in the next few years, but also that the maintenance has to be improved and better organised, especially with GCCL, who should go on with its programme of revamping its ginneries.
The only investments that should be done are linked to the handling of the lint bales, the present situation being not satisfactory and leading to possible quality problems.

3.8 The financial situation of the cotton companies

The detailed financial situation for the three main cotton companies (GCCL, NULUX, PDL) is shown in a confidential annexed report ; below is the global situation of the companies, some data being used to describe the evolution since 1997.

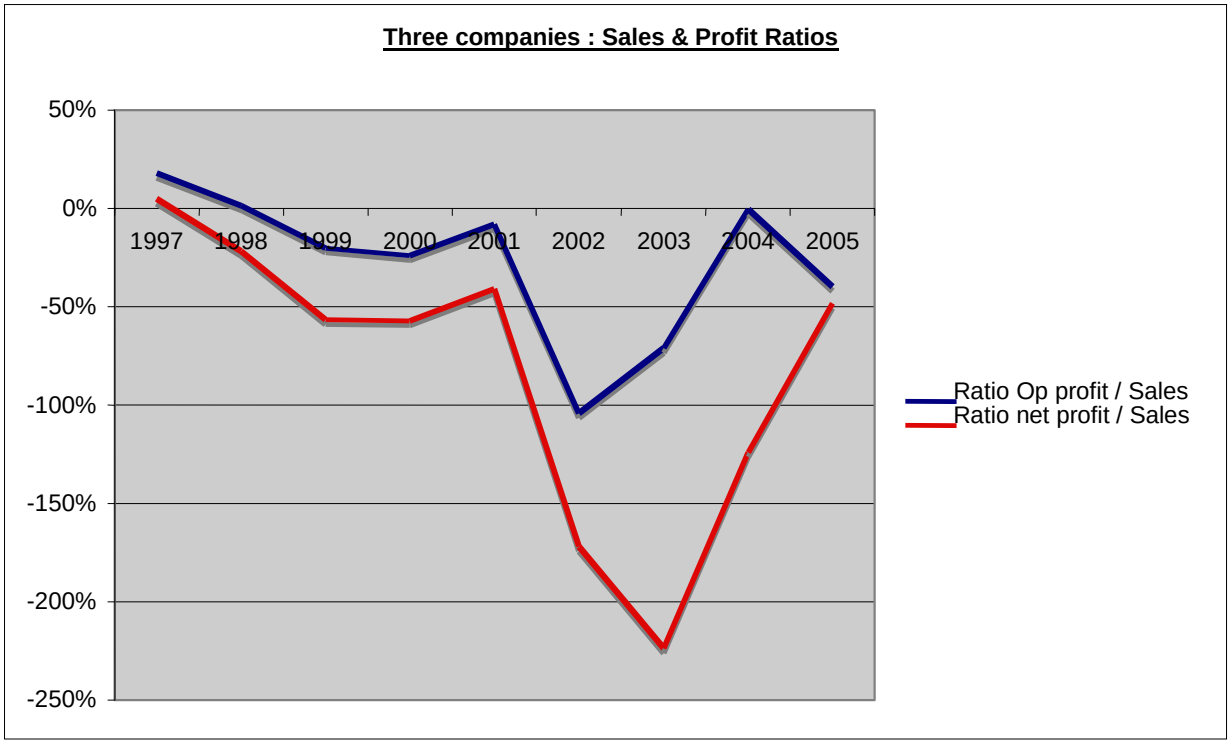
3.8.1 Profitability of the cotton companies

The graphs below shows the evolution of the profitability of the three companies:



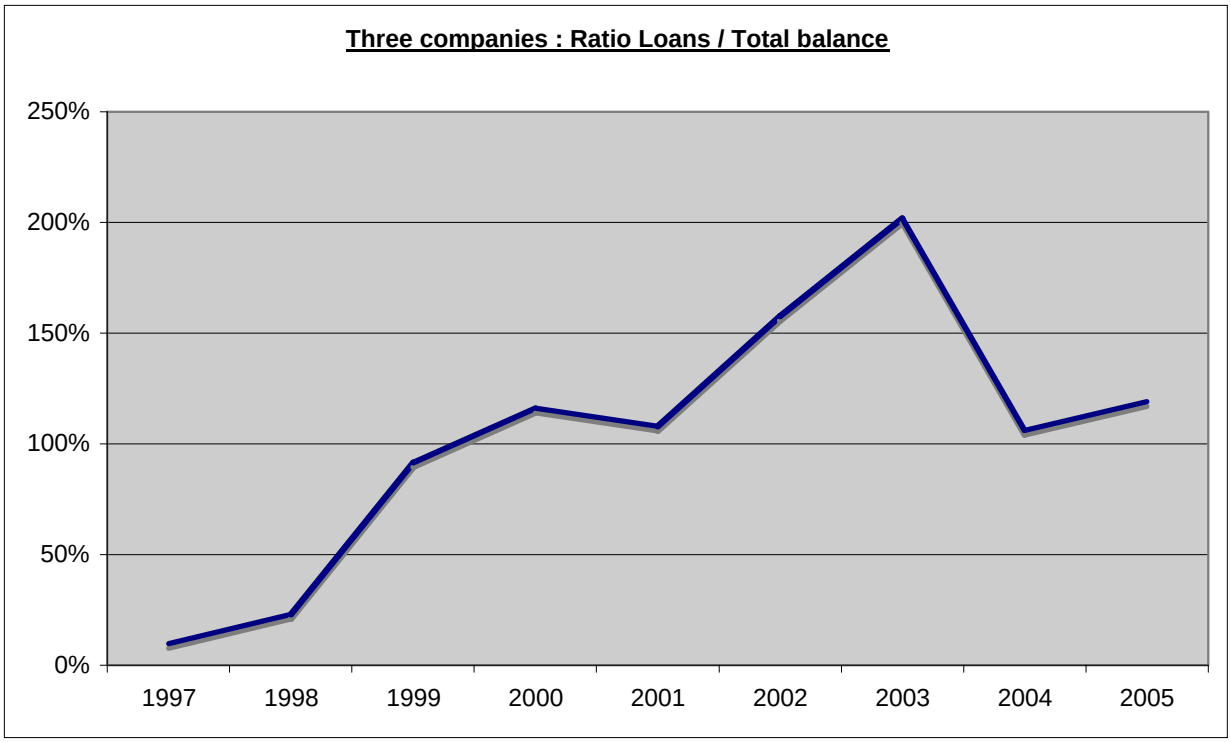
After a sharp decline from the late nineties up to the year 2003, the sales have recovered since year 2004, linked to GCCL improved situation. The operating and net profits remain however negative, and the three companies have accumulated a total net loss of 53.6 Million USD since 1998, to be compared with total sales amounting 72.3 Million USD, i.e. about 71%! The financial situation of the three companies can therefore be considered as rather disastrous, and definitely not sustainable.

The evolution of profitability ratio shown in the graph below confirm those observations

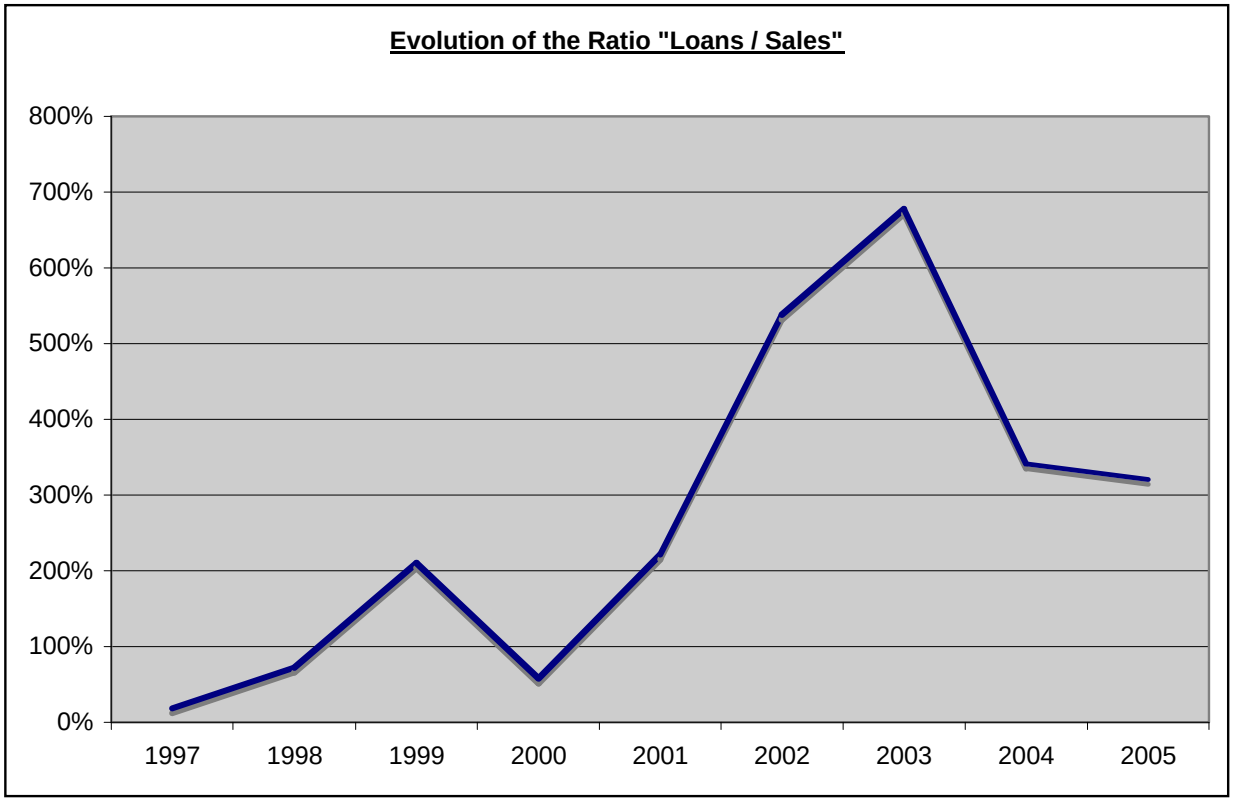


3.8.2 Assets and liabilities

The consequence of such losses is the worsening of the debt situation, with a ratio "loans / total liabilities" higher than 100% as shown in the graph below :



When compared to the sales, the amount of the loans owed by the companies is very high, as shown in graph below ; the improvement of the situation since 2004 is rather artificial, being linked to the swap "debt-equity" undertaken by GCCL.



3.8.3 Conclusion

The financial situation of the three coton companies is very bad and none of them can expand its activities unless a radical change occures in order for them to improve their profitability.

4 THE FUTURE OF COTTON SECTOR

As mentioned in Chapter 3.3, Ghana has never been a large producer of cotton, especially if compared to neighbouring countries; we have shown that there are no fundamental reasons for such a situation, natural and human resources being available and enabling a much higher level of production. The main reason for the non-development of cotton production in Ghana has been the lack of organisation of the sector.

4.1 Estimation of potential for cotton production in Ghana

The table below shows some data related to demography and the land used for agriculture. Some of the data are only estimations, since no data are available, like the number of farm households for instance.

The potential for cotton production in Ghana depends on the following factors:

- The number of farmers growing cotton,
- The average area grown in cotton by cotton growers,
- The average yield obtained from the fields.

Number of cotton growers:

At the moment, there are about 33 000 cotton growers in the three Northern regions of Ghana, which represents less than 20% of the total number of farmers. Based on the conditions of each region and on the experience from neighbouring countries, it has been estimated that one could expect the following proportion of cotton growers among the total number of farmers:

- In Northern region: 50% of cotton growers
- In Upper West region: 60% of cotton growers
- In Upper East region: 70% of cotton growers

Those differences are linked to the fact that there are opportunities and alternatives to cotton in the Southern part of the cotton area (Tamale area) than in the Northern part (Upper East for instance).

Remark: The data of the table are based on the population census conducted in the year 2000. The number of farmers will of course increase in future, its rate of growth being difficult to estimate, and will probably be different according to region. The density of population is very different according to zones (higher than 100 / km2 in Upper East, about 30 / km2 in Northern region). The table below shows the impact of three kinds of population annual rate growth over periods of 10, 15 and 20 years:

Period of time	Population annual growth rate		
	2%	2.5%	3%
10 years	21.9%	28.0%	34.4%
15 years	34.6%	44.8%	55.8%
20 years	48.6%	63.9%	80.6%

Average area grown in cotton per farm:

At the moment, the average area grown in cotton per farm is below 1 hectare (0.55 Ha during the last five years), but this figure could increase significantly providing solutions are brought to land preparation issues.

The following figures have been used in the calculation, based on the hypothesis that farmers[8] will be able to grow more cotton in the zones with more animal traction (mainly Upper East):

- In Northern region: 1 Ha of cotton per farmer
- In Upper West region: 1.5 Ha of cotton per farmer
- In Upper East region: 2 Ha of cotton per farmer

Seed-cotton yields:

Three hypothesis have been considered for the average seed-cotton yields: 1 T / Ha, 1.25 T / Ha and 1.5 T / Ha.

Estimation of seed-cotton production:

The table below summarizes the above mentioned data and shows the estimation of cotton production estimation:

	Northern Region	Upper East Region	Upper West Region	TOTAL
DEMOGRAPHIC DATA (Year 2000 census)				
Total population	1 820 806	920 089	576 583	**3 317 478**
Population density (/ km2)	25.9	104.1	31.2	**33.9**
Total active population	897 509	429 602	299 434	**1 626 545**
% Total active / Total population	49.3	46.7	51.9	**49.0**
Agriculture active population	644 507	294 961	225 688	**1 165 156**
% Agric active / Total active	71.8	68.7	75.4	**71.6**
Estimated number of farms *	107 418	49 160	37 615	**194 193**
POTENTIAL FOR COTTON PRODUCTION				
Average number of cotton growers last 5 years				**33 000**
Potential cotton production				
% cotton growers / total farmers	50%	70%	60%	
Number of cotton growers	53 709	34 412	22 569	**110 690**
Area in cotton per farm (Ha)	1.0	2.0	1.5	
Total area in cotton (Ha)	53 709	68 824	33 853	**156 386**
Potential seed-cotton production (T)				
Average Yield = 1 000 kg / ha	53 709	68 824	33 853	**156 386**
Average Yield = 1 250 kg / ha	67 136	86 030	42 317	**195 483**
Average Yield = 1 500 kg / ha	80 563	103 236	50 780	**234 580**

* One farm = 6 active

[8] In Southern Mali, where almost all cotton growers have bullocks, the average area in cotton is higher than 3 hectares per farmer.

If one consider an average yield of 1.25 T / Ha for seed-cotton, more realistic than 1.5 T / Ha, the potential production, according to the hypothesis, can therefore be estimated at about 200 000 Tons of seed-cotton, with the 2000 population figures. Those estimations are rather conservative; more favourable hypothesis and the natural growth of the population would lead to a potential production of 300 000 T within the next 10 or 15 years.

Below is a possible evolution of seed-cotton production, based on a annual 30% increase of production, leading to a production of more than 200 000 T after 10 years:

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
T of seed-cotton	20 000	26 000	33 800	43 940	57 122	74 259	96 536	125 497	163 146	212 090

Potential cotton development in other regions: from an agronomic point of view, it is possible to grow cotton in other regions, like Bronghafo or Volta, providing there is a sufficient period of time at the end of the cotton cycle without any rain, in order to allow the harvesting of seed-cotton in good conditions. One advantage of those regions would be a shorter distance from the coast, i.e. lower costs of transport for inputs, lint and seed. However, the main constraint to cotton production in those regions will be, as mentioned in the South of the Northern region, the competition from other crops, more profitable and/or easier to grow. Therefore, one should be careful in trying to promote cotton production in the South of Ghana, and preliminary studies and surveys should be undertaken before initiating any large scale project. It should also be noted that there are no ginneries in those regions, which would therefore require a heavy investment at the beginning of any project promoting the cotton production.

4.2 Conditions for the development of the cotton sector

Among the numerous problems faced by the cotton sector stake holders, two of them are crucial: (i) the question of a definition of a cotton company and the zoning situation and (ii) the financial issues.

4.2.1 The zoning and the cotton companies

At the moment in Ghana, one can distinguish two kinds of “cotton companies”: the ones who own a ginnery and the ones who do not, and have to gin the seed-cotton they purchase from farmers at the existing ginneries. Since the principle of zoning is now accepted, the question is to decide who should be considered as cotton companies. There are two main answers to this question: (i) one is that any company willing to promote the cotton production with farmers should be allowed to be a “cotton company” and (ii) the other answer is that only companies with ginneries should be considered as “cotton companies”.

Considering (i) that the risk of seed-cotton diversion and poaching increases proportionally to the number of companies, (ii) that a company without ginnery cannot do anything more and/or better than a company with a ginnery, (iii) the limited size of the Ghana cotton sector and that four companies have ginneries, (iv) the fact that any company with a ginnery has shown through its industrial investment a genuine interest in the cotton sector, it seems obvious that only companies who own ginneries should be considered as cotton companies and be entitled to promote the cotton production with farmers. This would lead to four companies allowed to work in the cotton sector: GCCL, Nulux Plantations, Plantations Development Ltd and Incof Ltd.

4.2.2 Financial issues

Finance is the cornerstone of the cotton industry, as farmers need to be pre-financed for the input supply and the purchase of their crop:

Because of the long delay between (i) the expenses required to organise of the cotton production: inputs, to be purchased at the beginning of a year and seed-cotton to be paid to farmers at harvesting time and (ii) the income generated from the sale of the lint and cotton-seed (between 3 months and 1 year after harvesting of seed-cotton), the needs in working capital are high and a cotton company can expand its business only it has the sufficient financial resources, at a reasonable cost.

Two main risks can cause a degradation of the financial situation of a cotton company:

- If farmers do not repay the loans received for the inputs: too low yields, diversion of seed-cotton etc.
- If the price of lint is too low to cover all the costs of production, including the cost of seed-cotton, that represents more than 2/3 of its total cost.

During many years, the total liberalisation of the sector lead to the creation of several cotton companies, attracted by the possibility of getting loans from ADB to promote cotton production with farmers (input supply etc.). Unfortunately, it happened that some of those companies where not genuinely interested in the cotton sector and used the loans they benefited from ADB for other purposes. At the same time, diversions and “poaching” of seed-cotton became widely spread and that lead to heavy indebtedness for the cotton companies who had been involved in the input supply on credit. The high interest rates prevailing in Ghana have only worsened the situation and the financial situation of all companies became therefore critical. Actually, all of them would go bankrupt if ADB wanted the debts to be repaid. The solution has been found in the case of GCCL through a swap “debt-equity”, leading to the control of 78% of GCCL capital by ADB. No solution has been found so far with the other companies and unless this issue is solved, their survival is not guaranteed. This debt issue puts the companies in a very difficult situation, because they cannot borrow any money from banks to pre-finance the input supply for the farmers and to buy the seed-cotton. They have therefore to use their own limited resources to run their business, not enabling to expand the cotton production as they could without the financial constraints. The financial issue is therefore the major bottleneck for the cotton industry in Ghana, and should be solved urgently.

Because the three « smaller companies » are highly indebted with ADB, they could be bankrupt if the Bank wanted its debts to be repaid immediately. This means that ADB, through its ownership of GCCL and its position of creditor with the other cotton companies is actually the major or even the only actor, i.e. has the monopoly of the cotton sector, which is not a satisfactory situation. In the short term, ADB should therefore solve the issue of the debt with the three companies Nulux, PDL and Incof, and should make a clear commitment to sell its majority share of GGCL.

5. POSSIBLE AFD INVOLVEMENT IN THE GHANAIAN COTTON SECTOR

There are justifications for an AFD support to the cotton industry in Ghana; however, some important issues should be addressed before any involvement.

5.1 Justifications

1. There is a big potential for cotton production in Ghana, similar to neighbouring countries. The cotton production can increase significantly with a better organisation of the sector, if clear rules are established for all stakeholders and if financial resources are made available for cotton companies.

2. The three “Northern regions” of Ghana are the poorest in the country and farmers have the lowest income; cotton can play a major role in improving the livelihood of hundreds of thousands of people.

3. The existing ginning capacity is far beyond the actual production, and no heavy investments are needed to increase the production up to 100 000 T of seed-cotton.

4. The cotton sector is now better organised, with the emergence of professional organisations (cotton companies and cotton farmers association) and of an inter-professional body (standing committee). All stakeholders now agree on the necessity of zoning and the necessity of confidence among all of them.

5. Yields and repayment rates of input loans are improving and a growing proportion of farmers is now convinced that only well looked after and intensive cotton growing can be profitable.

6. With a better organisation and higher quantities produced, the cotton produced in Ghana could be more profitable than cotton from Burkina Faso and Mali, thanks to (i) lower costs of transport (shorter distance from sea) and (ii) a currency non overvalued compared to the US$.

7. The financial situation of GCCL has been improved and the company has now a new management and the necessary resources to finance its growth.

8. There is a genuine commitment of private companies in the development of the Ghana cotton sector; those companies have already invested a lot of financial resources in the industry and are really committed to expand their activities if their financial situation improves (debt).

9. Both national and international investors have shown some interest in GCCL when ADB sells its majority share in the company.

5.2 Possible fields of intervention for AFD

Below is a tentative list of what could be the various fields of intervention in which could be involved an AFD financed aimed at supporting the Ghanaian cotton sector:

5.2.1 Capacity building & training:

The need of training and capacity building is obvious, at all levels of the sector, and a organise the setup of training programmes aimed at improving the capacity of various stakeholders of the cotton sector: (i) employees of the cotton companies, (ii) farmer's groups and associations, (iii) professional and inter-professional organisations, (iv) staff of the three Northern Ghana RADUs etc.

One important goal of a cotton project would be the support to the setup of an inter-professional organisation, based on the existing standing committee for instance.

5.2.2 Improvement in the seed-cotton price methodology

Smooth relations between the main stakeholders of the cotton sector, cotton growers and cotton companies, is a crucial condition for its stability and development. The main subject of conflict between them is the price of seed cotton as it has been seen in 2006; therefore, it is very important that both parties agree on an objective fair price fixation system, and AFD could support Ghana cotton sector in setting up such system, based on the experience gained from neighbouring countries.

5.2.3 Research and extension, lint classing,

As mentioned in chapter 3.6, the situation of research end extension is very poor at the moment and a project could design applied research programme, aimed at improving some of essential basis of the cotton sector, as the cotton varieties and seed production scheme for instance.
Seed cotton quality and lint classing are also important issues that a project could deal with, by supporting uniform systems to be used by all cotton companies and cotton producers.

5.2.4 Financial issues

The debts from farmers towards the cotton companies have disastrous impact on the financial situation of the all sector and can put cotton companies in a position of bankrupt. A cotton project could assist producers and cotton companies in supporting the involvement of rural banks in credit schemes aimed at supplying farmers with inputs paid on credit. Three parties contracts could be setup, involving (i) the cotton growers, (ii) the cotton companies and (iii) the rural banks.

5.3 Pre-requisites before an AFD involvement in the cotton sector

The present situation is not suitable for an AFD involvement, several points should be considered as pre-requisite:

- Enforce zoning and limit the number of cotton companies to the four companies who own a ginnery.
- Sustainable and long-term solution should be found to solve the debt issues of the private Cotton Companies, in order for ADB to finance the cotton sector.
- The question of ADB role in the cotton sector, and in particular its ownership of GCCL should be clarified, as it is not the role of GCCL to remain durably the majority shareholder of the company. A plan for disengagement should be established, with clear deadlines.

6. PERSPECTIVES AND RECOMMANDATIONS

Recommendations

Apart from the pre-requisites mentioned about a possible AFD involvement in the cotton sector, recommendations summarising the comments made in the chapters above have been issued. Some of them could be implemented shortly, while some others are from a longer-term point of view:

- To agree and implement a common (used by all seed companies) and effective seed-cotton grading system.

- To prepare a "Cotton Development Contract" between Cotton Companies, Farmers, ADB and MOFA: a formalisation of the relations between farmers, cotton companies, with a strong involvement of MOFA would create a better institutional environment for the cotton sector. This kind of "contract" has been setup in most of the neighbouring countries, it describes the role, rights and obligations of all parties.

- To organise an efficient and fair input supply system, based on a tender to be organised for the entire cotton sector.

- To prepare and implement a cotton seed multiplication programme, in collaboration with SARI.

- Cotton companies should study with ADB (or any other bank ready to finance the cotton sector) to "dollarise" the financial issues, as they now sell all their production abroad, paid in USD. The interest rates in Cedis are at the moment still very high, more than 20% per annum, while the average depreciation rate Cedis vs. USD has been during the last years below 5% a year; therefore, as is seems possible for the cotton companies to borrow USD at a rate lower than 12% par annum, it becomes financially more sound to borrow in USD instead of borrowing in Cedis (providing it is legal for a company to do it).

- To improve and strengthen the relations between RADUs and the cotton companies, in order for MOFA staff to support them on technical issues (extension, training of CPAs and cotton growers), group formation etc. MOFA - RADUs and the standing committee should also be in charge of collecting the data on the cotton sector from the cotton companies.

- Experiment no-tillage cotton sowing, using experience from Cameroon, Burkina Faso and Mali, in order to try to solve the question of land preparation.

- Use proper compound fertilizer (NPKSMgB) and urea for cotton instead of 3 x 15 and ammonium sulphate.

- Improve the seed-cotton price fixation system, using a two-stage system, based on the world cotton price; it would be interesting to learn from the experience of neighbouring countries.

- Set up a standardised seed-cotton and lint classing system.

- Improve the farmer's group organisation, and initiate the creation of Apex entities, based on administrative and cotton companies zones subdivisions.

- Improve the links between the research, the cotton companies and the farmers.

- Improve the technical training and extension of CPAs.

MOFA role in the cotton sector

The implementation of most of the recommendations needs a stronger involvement of MOFA in the cotton-sector; MOFA should clearly define the “rules of the game” and make sure that all stakeholders fulfil their obligations. This is particularly important in the case of zoning and cotton companies, as well as for the debt issue, which may require an external arbitrage to be settled.
More involvement of MOFA does not mean it should interfere in the day-to-day relations between farmers and cotton companies, but MOFA should regulate the cotton sector in order to assist the stakeholders when needed and enforce the rules and regulations when it appears to be necessary.